the OIL AND GAS JOURNAL

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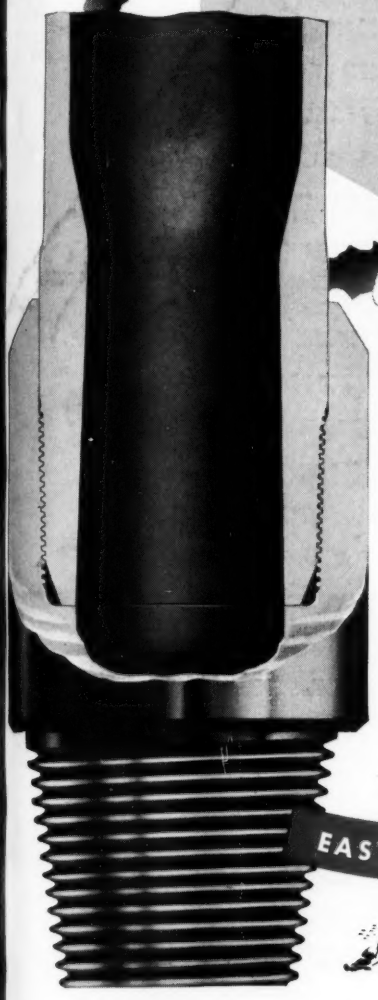
REED TOOL JOINTS LAST LONGER



● Advanced metallurgy gives Reed Tool Joints an extra hardness and extra toughness that means longer wear on your rig.

And pre-lubrication infused into the tool joint threads effectively prevents galling during the entire life of the tool joint.

Use Reed Tool Joints on all your rigs and get the longer life that means lower drill string costs.

EASY REPLACEMENT IN THE FIELD . . .

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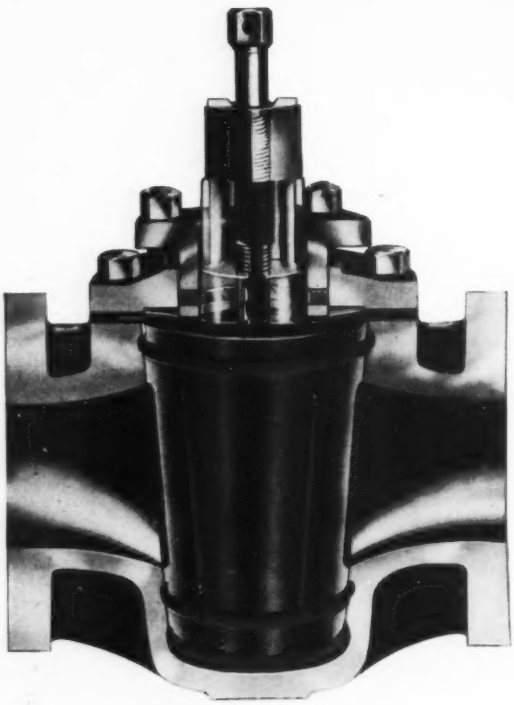

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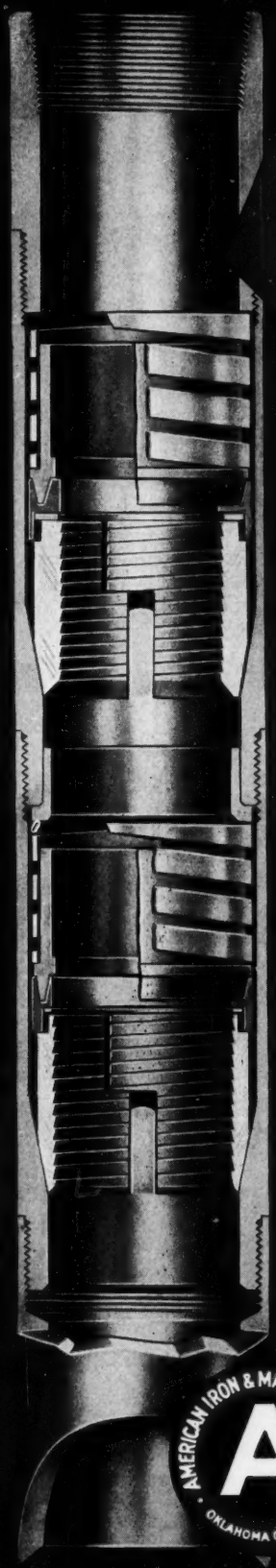

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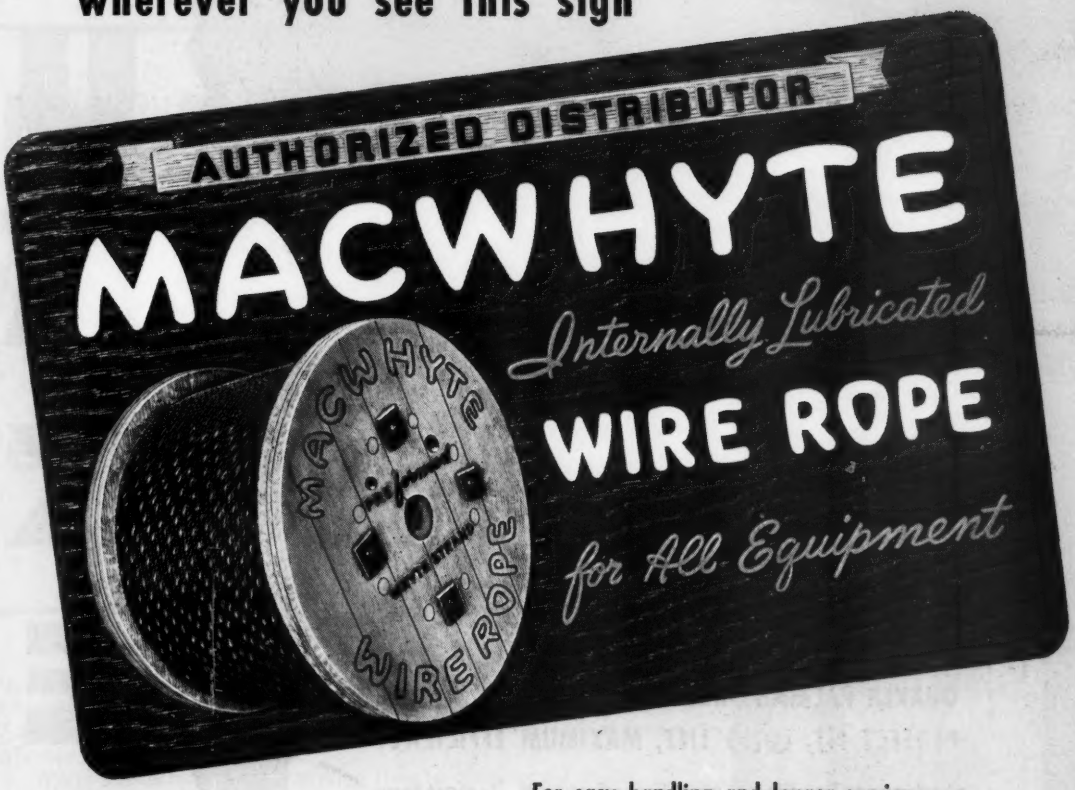

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Performance Counts Again..

LINK-BELT Roller Chain *Helps Smash 4 Drilling Records!*

The Rocky Mountain Drilling Company's rig, a National #125 equipped with standard Link-Belt Silverlink Roller Chain, broke 4 records in drilling 17,696 feet on California's Maxwell #1, near Ventura, for Standard Oil Company of California . . .

1 — World's record for fastest drilling time to comparable depth.
2 — World's record for deepest hole ever drilled by a contractor.
3 — World's record for deepest hole ever drilled with diesel power.
4 — California record for deepest hole ever drilled in the state.

That spells PERFORMANCE in capital letters for Link-Belt Silverlink Roller Chain . . . for these records were broken without chain trouble.

Maxwell #1 was the second well drilled with this rig.

Several pulls of over 300,000 lb. were made on stuck pipe . . . again proving that Link-Belt Silverlink Roller Chain can do more than deliver the power — it can take the shock loads too!

This Link-Belt chain performance is all the more impressive because this rig was only rated to drill 12,500 feet, and actually went down 17,696 feet — a depth overload of more than 40%!

Such performance proves why most rig manufacturers . . . and most operators . . . specify Link-Belt Silverlink Roller Chains!

LINK-BELT COMPANY

Indianapolis 6, Dallas 1, Houston 2, Kansas City 6, Mo., Los Angeles 33, New York 7, Toronto 8.

11,361

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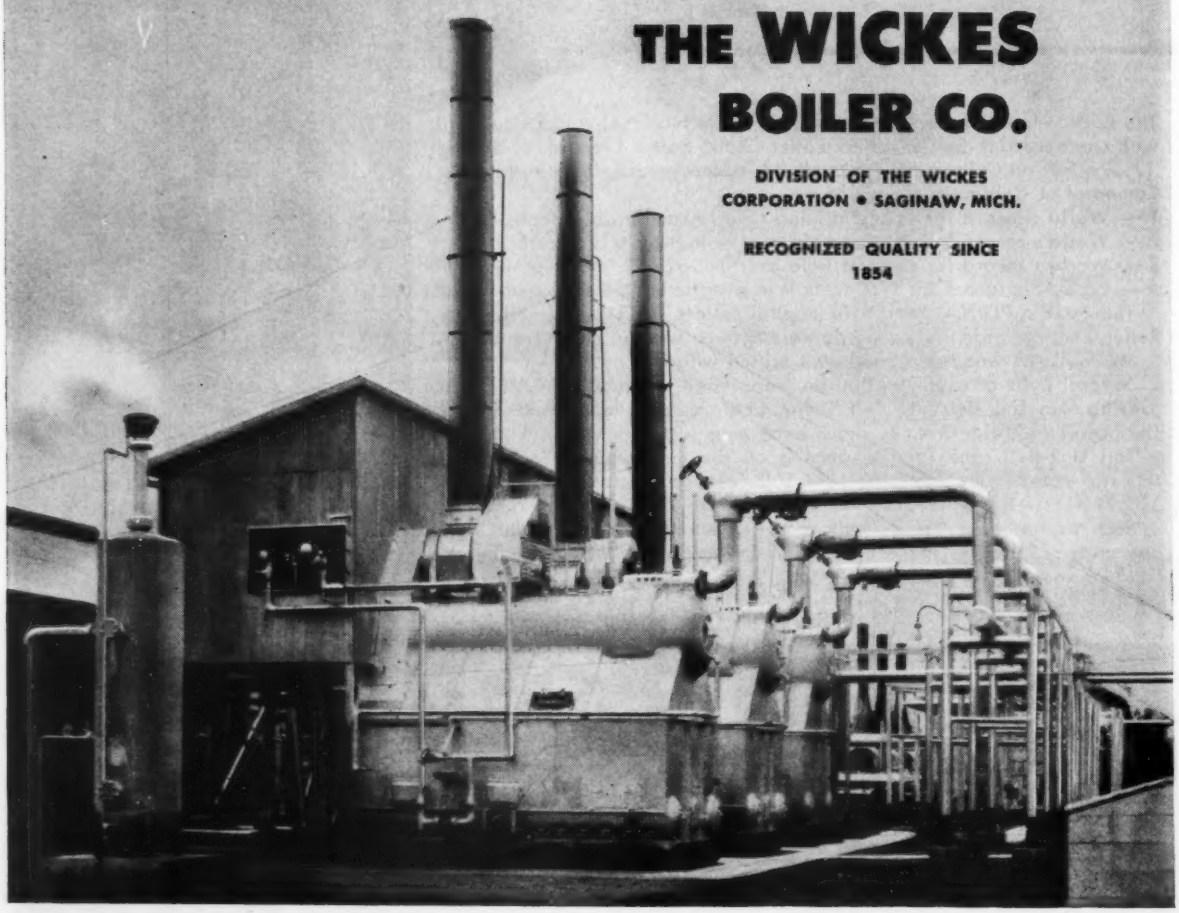
Profitable processing of crude petroleum into fine oils and fuels requires the most efficient equipment available. These three Wickes Type-A water tube steam generators are operating in an oil field near Delhi, Louisiana. Wickes Package Type-A Steam Generators are compactly designed and efficiently engineered for immediate installation with least possible erection problems. Units are designed for pressures up to 850 psi, producing up to 200,000 lbs. steam per hour. Write for descriptive catalog.



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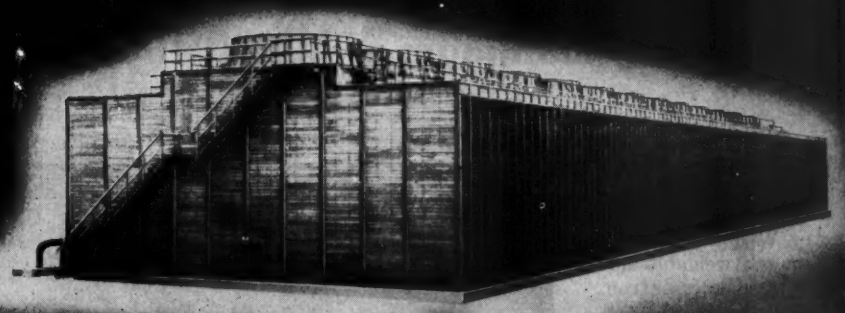

FOR AN ENGINEERED TOWER STRUCTURE

Every Double-Flow Cooling Tower is structurally sound . . . able to give twenty-four hour a day, year around service.

Double-Flow cooling towers have been subjected, during the past decade, to hurricane, earthquake, corrosive atmosphere and other similar tests without suffering a single loss. Here's why:

LUMBER . . . only the finest HEART QUALITY REDWOOD is used. All structural members are properly sized and are free from sapwood that is subject to fungus and insect attack.

HARDWARE . . . heavy bolts are used throughout with ring connectors added at critical joints . . . no nails are used to bear any structural load.

MECHANICAL EQUIPMENT SUPPORT . . . massive, corrosion-free wood crossbeams are used to support the mechanical equipment. Diagonal bracing in this area gives added strength.

COLUMNS . . . vertical columns placed on a maximum of six foot centers. Louver posts are machined to accommodate the continual expanding and contracting slip-fit louvers.

BRACING . . . transverse and longitudinal bracing extending from each six foot height to the bottom of the tower.

Each joint and every detail, as well as the major members of a standard MARLEY DOUBLE-FLOW Cooling Tower are guaranteed against a 30-pound wind. The low, wide design of the Double-Flow gives unusual stability.

To be sure YOUR new cooling tower is STRUCTURALLY SOUND, Specify MARLEY DOUBLE-FLOW!

Ask for a Marley Factory-Trained APPLICATION ENGINEER to tell you more about the MARLEY-DOUBLE-FLOW and its ENGINEERED STRUCTURE. He'll be glad to help you solve your water cooling problems. No cost or obligation.

MARLEY COOLING TOWERS

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The Aircomatic Process . . . An entirely new idea for welding aluminum in ALL POSITIONS

Sensational in its conception, Airco's new *Aircomatic Process* introduces an entirely different aluminum fabricating technique to industry. With this process, welding of aluminum and weldable aluminum alloys ranging in thicknesses from ⅛" to 2" plus, may be performed in all positions – flat, horizontal, vertical and overhead. All of the standard joint designs may be welded in these positions.

Single or multi-layer welds can be deposited using either beading or weaving techniques. Vertical welds may be made with either upward or downward travel. In short, all of the facility associated with metal arc welding of steel is made available by this process, plus the advantages of high deposition rates, far exceeding those attained by usual welding methods, which results from continuous filler metal feed and the absence of slag.

This new welding method consists of feeding a bare filler metal in wire form at speeds ranging from 100 to 300 inches per minute through a manually operated gun. The filler metal carries welding current and an arc is maintained between the end of the wire and the work. Power may be supplied from a standard d.c. welding generator. The arc is maintained within a controlled envelope of shielding gas.

THE ADVANTAGES OF THIS TOTALLY UNIQUE AIRCOMATIC WELDING PROCESS INCLUDE:

- . . . A manual welding process with the essential features of automatic welding.
- . . . Continuous deposition of filler metal at high rates.
- . . . Manual manipulation of an automatic process for welding in a vertical and overhead position.
- . . . High quality weld metal deposits.
- . . . Minimum edge preparation owing to deep penetration.
- . . . Ability to weld heavy sections with little or no preheat.
- . . . No flux required; slag removal eliminated.
- . . . Visible arc; no blind welding.

Investigate the many advantages the new Aircomatic Welding Process *offers you. For equipment, price, service or other pertinent information, call or write our nearest office.*

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The Beechcraft Bonanza

George E. Failing Supply Co.

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QEFSCO

"Cows Will Tell"

H. J. GODSCHALK
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Beech Aircraft Corporation
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Dear Mr. Beech:

As manufacturers of portable drilling equipment with four widely scattered branch plants in Houston and Midland, Texas Casper, Wyoming and Hattiesburg, Mississippi, we find our Beechcraft Bonanza an extraordinary time saver.

As an example, now we can travel between Enid to Midland, 400 miles away in two and one-half hours, whereas formerly it took ten to twelve hours by surface transportation. What's more, we're there and back the same day. Now all of us can visit our plants as often as we should, and the Bonanza has certainly stepped up our efficiency.

Ownership of our plane results in excellent customer service, too. We can fly up to meet men at airport terminals, bring them to our plant and have them on their way again in the space of a few hours. And we can delivery emergency parts and equipment anywhere, and cut a customer's idle time down to the minimum. We find our Bonanza both profitable and practical.

Very truly yours,

GEORGE E. FAILING SUPPLY CO.
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Because this business is fast-moving; and because fixed, scheduled transportation is rarely suitable, the speedy 4-place Bonanza has been "adopted" by key men in every phase of the industry. Geologists, drillers, marketing and sales companies, and manufacturers—such as the George E. Failing Supply Co.—daily gain *paying* advantages from Bonanza ownership.

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(INDEPENDENT WIRE ROPE CORE)

Preformed "Blue Center" Wire Rope

PERFORMANCE-PROVEN WITH OIL MEN

IN THE TOUGH SPOTS, rope with an Independent Wire Rope Core gives best and longest service! I.W.R.C. is outstanding where operating pressures are high; where heat resistance, additional strength, or minimum stretch are essential. But remember this . . . *the same features that make* I.W.R.C. *best for the tough spots help make it the longest-performing and most economical specification for a wide range of applications!*

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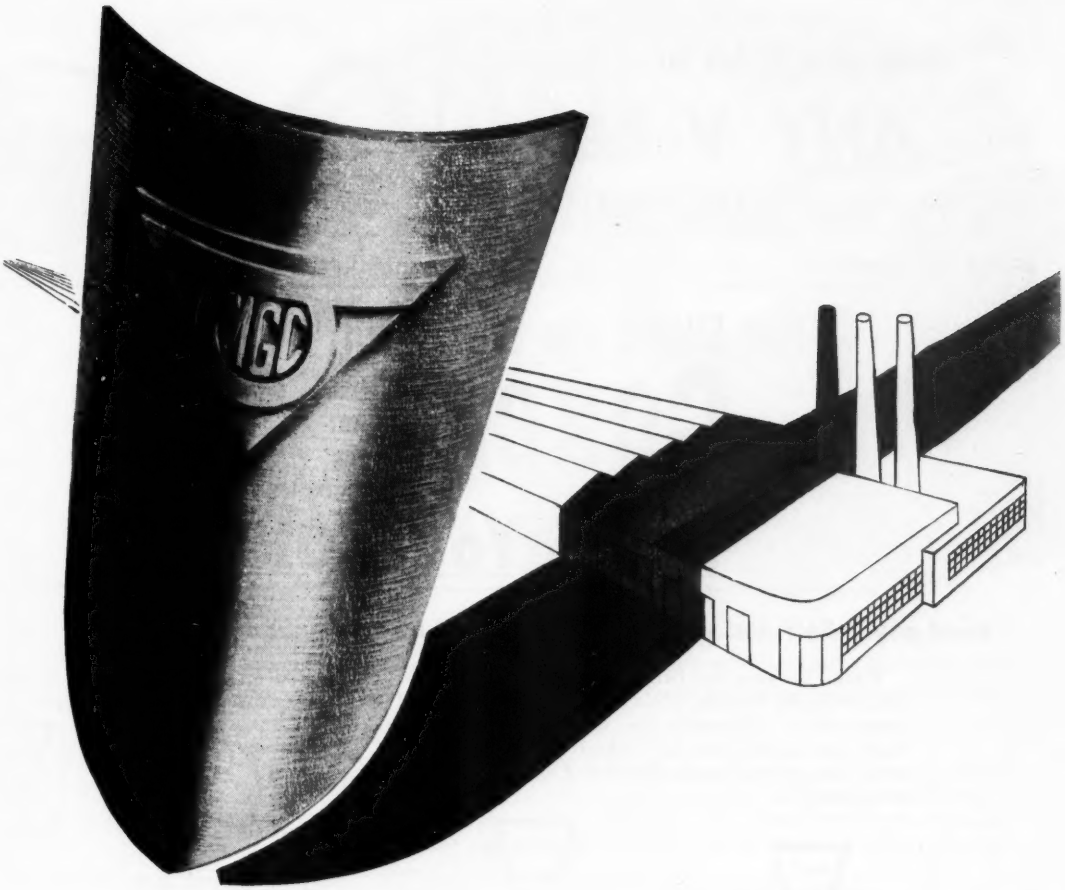

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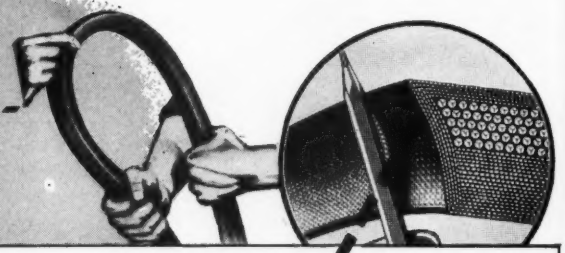
Grip the Sides of

ANY V-Belt...

FEEL the Sides CHANGE SHAPE

as the belt Bends—



—That SHOWS you Exactly WHY

THE CONCAVE SIDE

(U. S. PATENT NO. 1813698)

SAVES You MONEY

Bend any V-Belt and you can actually feel its sides change shape.

That's because the bending puts the top of the belt under *tension*, while the body undergoes *compression*. Naturally the sides of the belt *bulge out*—and if the belt is built with *straight sides*, you get the result shown in Figures 1 and 1-A, below:—

Straight-Sided V-Belt

How Straight-Sided V-Belt Bulges in Sheave-Groove.

Clearly, the bending forces a straight-sided V-Belt into a shape that does not fit the sheave-groove—and the bulging produces excessive wear along the *middle* of the *sides*.

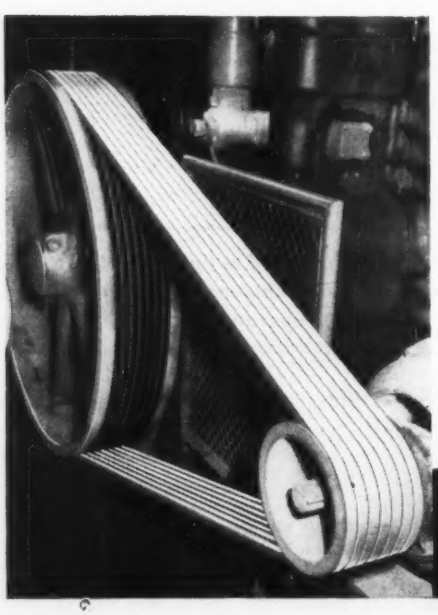
Now, bend the V-Belt built with the precisely engineered Concave Side (U. S. Patent No. 1813698)—the Gates Vulco Rope.

Gates Vulco Rope With Concave Side.

No Side Bulge. Precise Fit in Sheave-Groove.

You get the same shape change but *now* the new shape *exactly fits* the sheave-groove as shown in Figures 2 and 2-A.

Results—(1) *Uniform* side-wall wear; *longer* life. (2) *Full* sidewall grip on the pulley; carries heavier loads and sudden load increases without slippage — a big increase in drive efficiency — saving belt wear and also saving power!



The Concave Side is *MORE IMPORTANT* NOW Than Ever Before

Because the *sides* of a V-Belt are what actually *drive* the pulley, it is clear that any increased load on the belt means a heavier load that must be transmitted to the pulley *directly* through the belt's sidewalls.

Now that Gates *SPECIALIZED* Research has made available to you SUPER Vulco Ropes—carrying fully 40% higher horsepower ratings—the life-prolonging Concave Side naturally delivers greater savings today than ever before.

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DENVER, U. S. A.
The World's Largest Makers of V-Belts

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The Mark of SPECIALIZED Research

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SHOOT-N-TEST

THE JOHNSTON *all purpose* GUN PERFORATOR

Gives you maximum PORTABILITY!

THE JOHNSTON GUN PERFORATOR is flexible in operation and so completely portable that the entire unit can be transported in your regular field car! For each perforating job you need only the Firing Head and the Perforating Gun Sections—no special depth measuring devices, firing equipment or extra assembling tools are necessary.

After delivering the Johnston Gun Perforator to the well, you can select the exact number of Perforating Gun Sections needed for the job. When the quantity of perforations is known, you simply attach the correct number of Perforating Gun Sections to the Firing Head and lower the entire unit on the bottom joint of tubing or drill string to the zone selected for perforation. Bottom-hole hydrostatic pressure fires the Johnston Gun Perforator automatically following definite rotary and vertical manipulation of the connecting string by the driller.

And if you want a formation and pressure test made on the same run of tubing or drill string, you simply connect the Johnston Gun Perforator to *your* regular Johnston Formation Tester and Pressure Recorder for *combined* perforate-and-test operations. It's the slickest possible way of obtaining water shut-off information, doing exploratory work or testing for actual production.

FLEXIBILITY and PORTABILITY

are only two of the *many* outstanding advantages of the Johnston "SHOOT-N-TEST" All Purpose Gun Perforator. Here are other important Johnston features to consider when contemplating Gun Perforator equipment . . .

SAFE gun perforator operation! The Johnston Gun Perforator will not fire until subjected to *both* in-the-hole hydrostatic pressure and positive rotary and vertical manipulation of the pipe string by the driller.

POSITIVE FIRE of all projectiles! The safe, fool-proof hydrostatic firing principle of the Johnston Gun Perforator coupled with the flash-hole design of the Perforating Gun Sections assures positive fire of all projectiles.

ANY NUMBER OF PERFORATIONS possible! Any number of four, five or six-shot Perforating Gun Sections can be attached to the Johnston Gun Perforator Firing Head to provide the *exact* quantity of perforations needed for each job.

EXACT POSITIONING in producing zone! Accurate placement of the Johnston Gun Perforator at the *exact* depth for perforating is easily determined by pipe-in-the-hole tally. No rigging-up of special measuring devices is necessary.

MINIMUM OF EXPENDABLE SUPPLIES! The Johnston Gun Perforator needs only a minimum of loading supplies for each perforating job. The Perforating Gun Sections require only seals, powder charges and projectiles for reloading.

FAST, EASY MAINTENANCE! The Johnston Gun Perforator is outstanding for its simplicity of operation and trouble-free construction. The simple procedure of disassembly, cleaning, loading and reassembly can be done right on the rig floor.

Write **for NEW DESCRIPTIVE FOLDER**
On The Johnston "SHOOT-N-TEST" Gun Perforator!

SHOOT-N-TEST — Trademark — FORMATION AND 101-TON CASING TESTING

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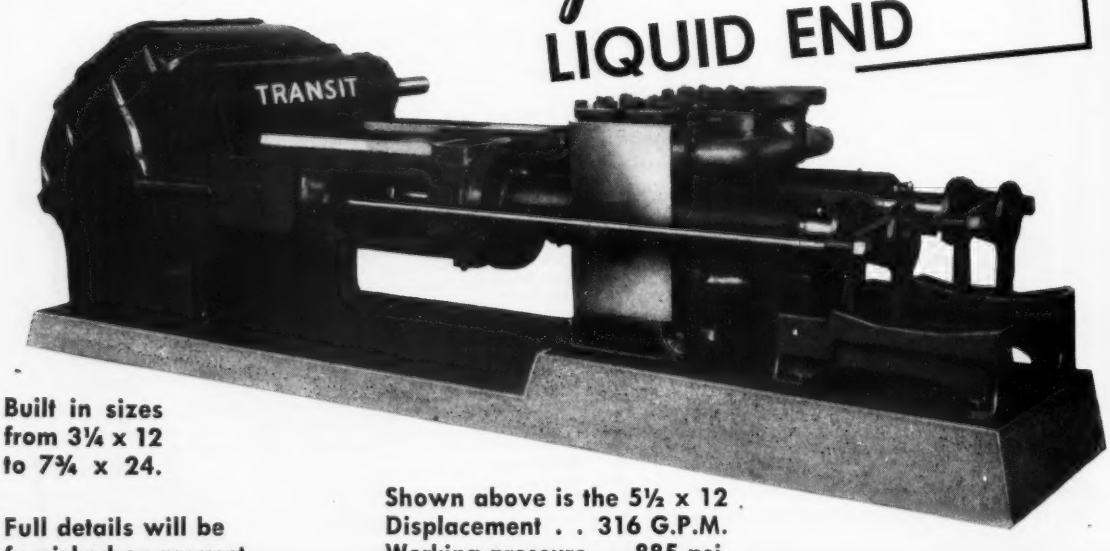
TRANSIT *Duplex* *Plunger* PUMPS

Increasingly preferred **— by pipelines, refineries, and gasoline plants for handling all petroleum products from heavy crudes to light hydrocarbons.**

STURDY POWER END
with
Forged Steel
LIQUID END



Built in sizes from 3¼ x 12 to 7¾ x 24.

Full details will be furnished on request.

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Displacement . . 316 G.P.M.
Working pressure . . 885 psi.

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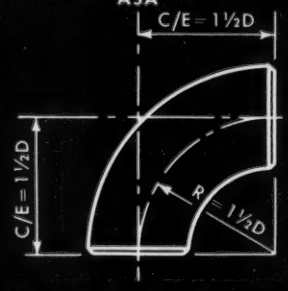
Improvements and economies in welded piping result from this *Variety* of MIDWEST ELBOWS

1

LONG RADIUS ASA

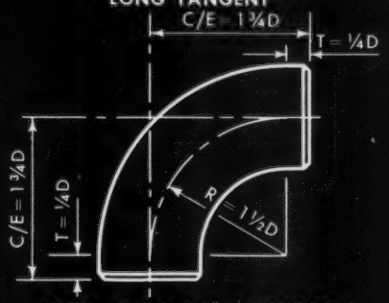


SIZES: ¾" TO 24", INCLUSIVE

Dimensions conform to applicable size range of American Standard for Butt-Welding Fittings, ASA B16.9. Radius and center-to-end dimension equal 1½ times nominal pipe size.

2

LONG RADIUS LONG TANGENT

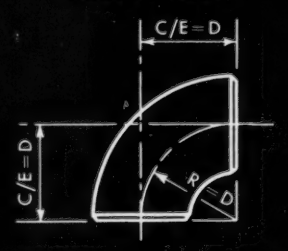


SIZES: 2" TO 20", INCLUSIVE

Same radius as ASA Elbows but with long integral tangent on each end — an exclusive Midwest feature that saves time and pipe. No price increase over ASA Elbows.

3

SHORT RADIUS

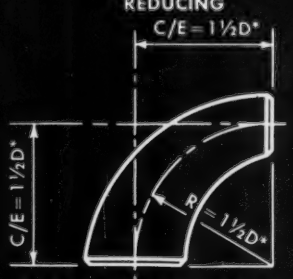


SIZES: 1" TO 30", INCLUSIVE

Where space limitations prevent use of ASA Elbows or Midwest "Long Tangent" Elbows shown above at right, these short turn elbows without tangents are recommended.

4

LONG RADIUS REDUCING



SIZES: 2" TO 12"*, INCLUSIVE

Midwest Reducing Elbow takes the place of a straight elbow and a reducer. It saves more than one-third of the welding and improves both design and appearance.

SYMBOLS { *C/E—Center-to-End Dimension* *T—Length of Tangent* } *D—Nominal Pipe Size* *R—Radius* **D—Dimension is for larger Pipe Size*

The *variety* of Midwest Welding Elbows is particularly important because of the exceptional latitude in design and economy in erection that it provides. For example, the Midwest Long Tangent Elbow permits faster, easier, more accurate lining up with pipe . . . removes weld from point of maximum bending stress . . . often eliminates a short nipple and its extra weld. Slip-on flanges are easily used with minimum change in flange and fitting.

This "Variety" is only one of several reasons why many users prefer Midwest Welding Elbows.

Only MIDWEST offers this VARIETY

MIDWEST WELDING FITTINGS Improve Piping Designs and Reduce Costs

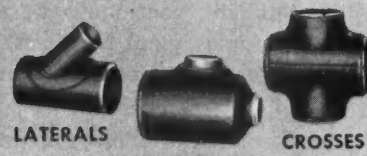
90° ELBOWS

REDUCING 90° ELBOWS — 45° ELBOWS

LAP-JOINT STUB ENDS — REDUCERS

CAPS — SADDLES — SLEEVES

RETURN BENDS — TEES



LATERALS — CROSSES

REDUCING-ON-RUN TEES

SHAPED NIPPLES — FLANGES

MIDWEST PIPING & SUPPLY CO., Inc.

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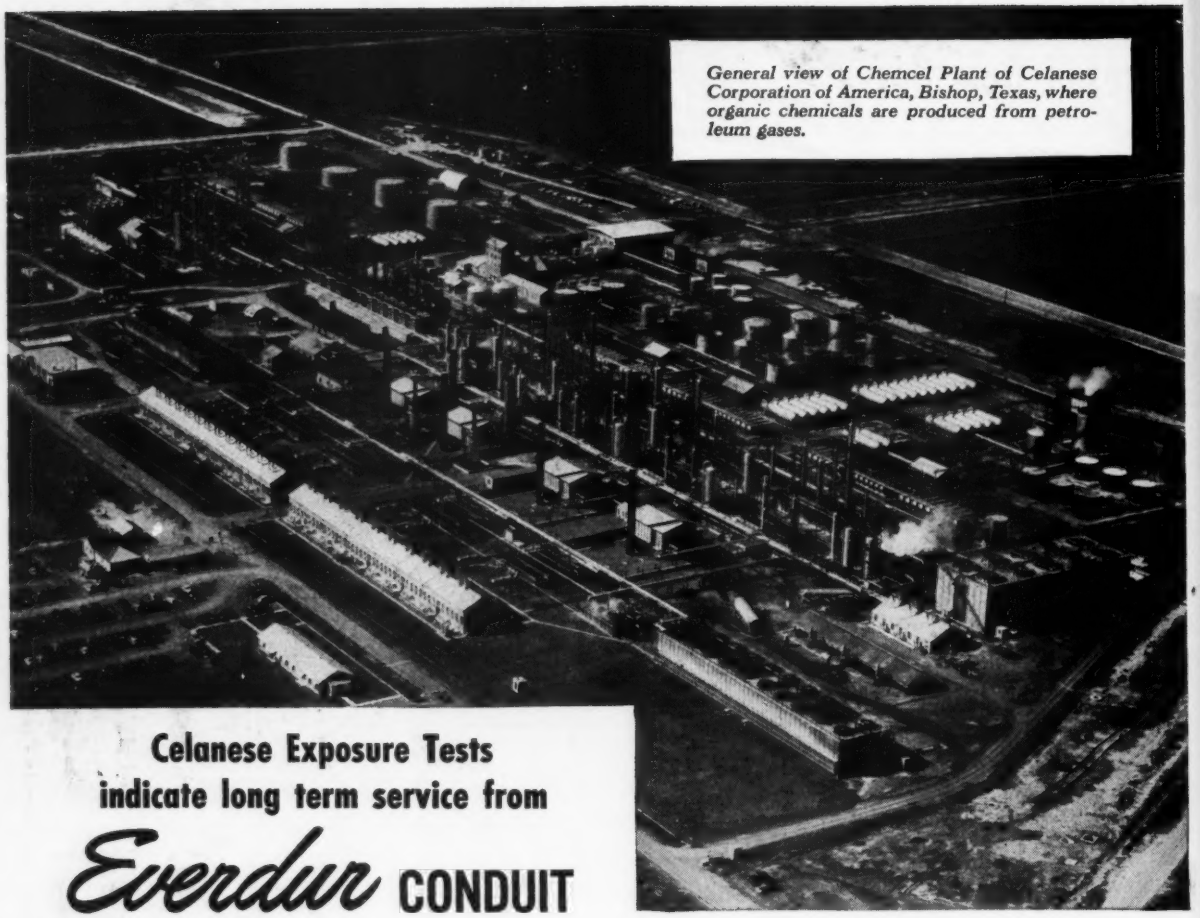
Sales Offices: New York (7), 30 Church St.

Chicago (3), 79 West Monroe St. • Los Angeles (33), 520 Anderson St. • Houston (2), 229 Shell Bldg. • Tulsa (3), 533 Mayo Bldg. South Boston (27), 426 First St. • Distributors in Principal Cities.



General view of Chemcel Plant of Celanese Corporation of America, Bishop, Texas, where organic chemicals are produced from petroleum gases.

Celanese Exposure Tests indicate long term service from *Everdur* CONDUIT

ELEVEN test specimens of Everdur* Rigid Electrical Conduit, ¾″ nominal size, mounted on top of cooling towers of the Chemcel Plant at Bishop, Texas, graduated with honors from a 95-day course in compound exposure.

These 2″ long test sections were exposed to sunlight, continuous water vapor spray, plant fumes, plant Northeast and Southwest winds and a temperature range of 32° F. to 87° F.

Examination showed no pitting of samples and an average corrosion rate of .000395 i.p.y. "During the test," states the Metallurgical Laboratory report, "the surface of the specimens became coated with a thin, black corrosion product film which would be in no way detrimental in the service intended."

"Everdur Conduit would," the report continues, "at the rates determined, last indefinitely in service as electrical conduit in the locations tested."

Everdur Copper-Silicon Alloy Conduit possesses high strength, is non-magnetic, workable and weldable. It is available in two wall thicknesses: rigid conduit (RC) in nominal sizes from ¼″ to 4″ inclusive; and the thinner walled electrical metallic tubing (EMT) in nominal sizes ⅜″ to 2″ inclusive. Complete lines of fittings . . . connectors, couplings, outlet boxes, etc. . . . are available in Everdur Alloys from leading manufacturers. 46224

*Reg. U. S. Pat. Off.

ANACONDA
from mine to consumer

Everdur

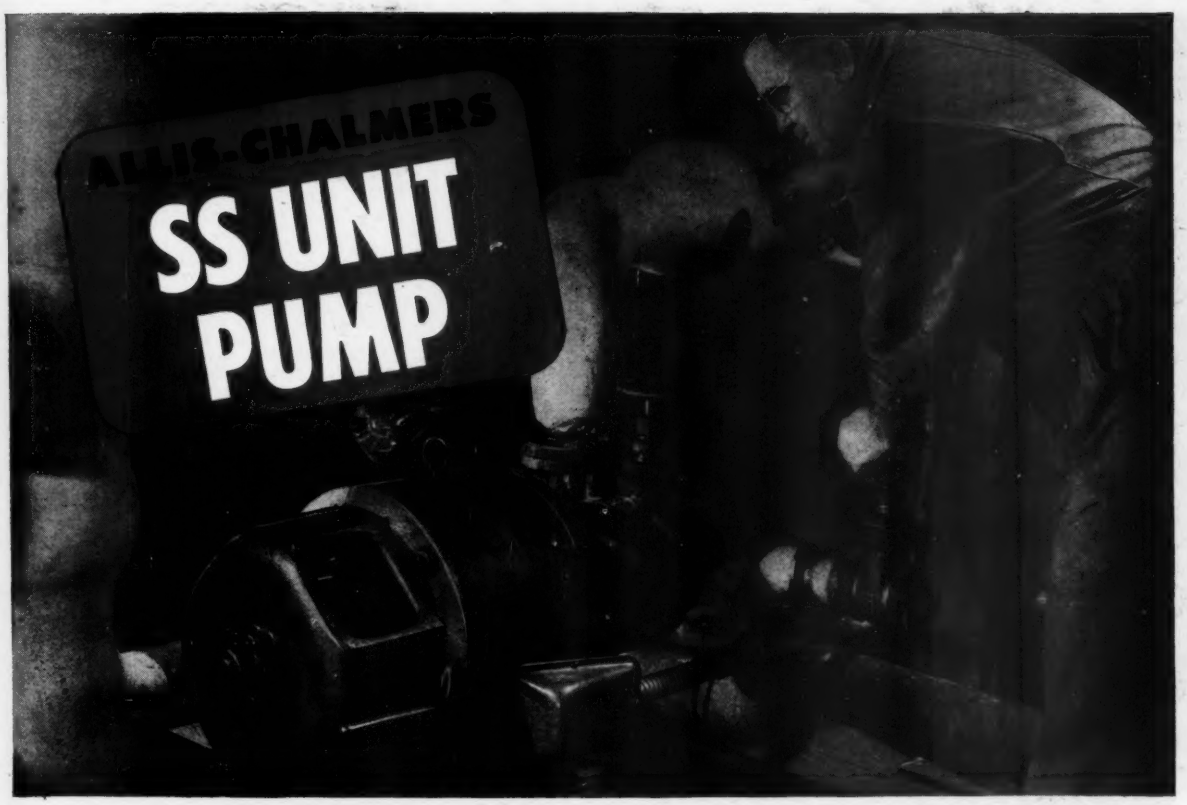
ELECTRICAL CONDUIT

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut

Subsidiary of Anaconda Copper Mining Company

In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*



50% MORE LIQUID
33% LESS POWER

User Reports: *Previous* displacement pump required 15 hp motor for 100 gpm capacity at 110 ft head. *Now* Allis-Chalmers SS Unit Pump with only 10 hp motor delivers 150 gpm at same head!

IN ADDITION, this same user reports savings in space and maintenance.

Paper, Petroleum, Mining, Chemical — in *any* industry, Allis-Chalmers SS Unit Pumps can be used for circulating, gathering, water supply, drainage, etc.

Check these 4 features: —

Deliver Rated Efficiencies — Every unit tested at the factory and the performance curve plotted. Efficiency is proved.

Heavy Construction — Compare section thicknesses, shaft diameters and other features. See why SS Unit Pumps run years without repairs.

Easy Maintenance — Compact design and few parts reduce maintenance. Bronze ring protects casing from wear. Is easily replaced when required.

Application Engineering — When a pump is recommended by an A-C Pump Application Engineer, you know that you are getting the pump that fits your needs exactly and that will give you dependable service at low cost per gallon.

SS Unit is one of many Allis-Chalmers models for most industrial pumping services. For information, see your Allis-Chalmers Authorized Dealer or District Office. Or write for Bulletin 52B6059E. Also listed in Sweet's. A 2603

SS Unit, Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.

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MOTORS — ½ to 25,000 HP and up. Matching Allis-Chalmers Control.

TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

ALLIS-CHALMERS, 1059A SO. 70 ST.
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DOUBLE DECK—DOUBLE CHECK

If filling losses far exceed standing losses in your storage installation, the Graver Improved Floating Roof *with full double deck* is your best protection. It's designed to prevent all the filling losses *plus* as high as fifty percent of the standing losses . . . the greatest possible overall saving for such set-ups as a deep water terminal.

The double deck, in addition to providing a buoyancy that is positive assurance against sinking under any conditions of weather or climate, insulates the stored product effectively against "boiling". Lying directly upon the surface of the liquid and sloping upward from the center, the roof eliminates the accumulation of vapor which causes corrosion where "sour" crudes are stored.

For a double check where filling losses are the major problem, specify the Graver Floating Roof with full double deck.

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GRAVER TANK & MFG. CO., INC.

East Chicago, Indiana

Graver offers a complete service to the petroleum industry including Expansion Roof Tanks, Floating Roof Tanks and pressure vessels. In addition, Graver is prepared to furnish specialized steel plate work such as fractionating columns and class one vessels as well as stainless and alloy fabrication; water conditioning equipment of all types; and through the Graver Construction Co., is prepared to handle all types of petroleum and chemical construction work.

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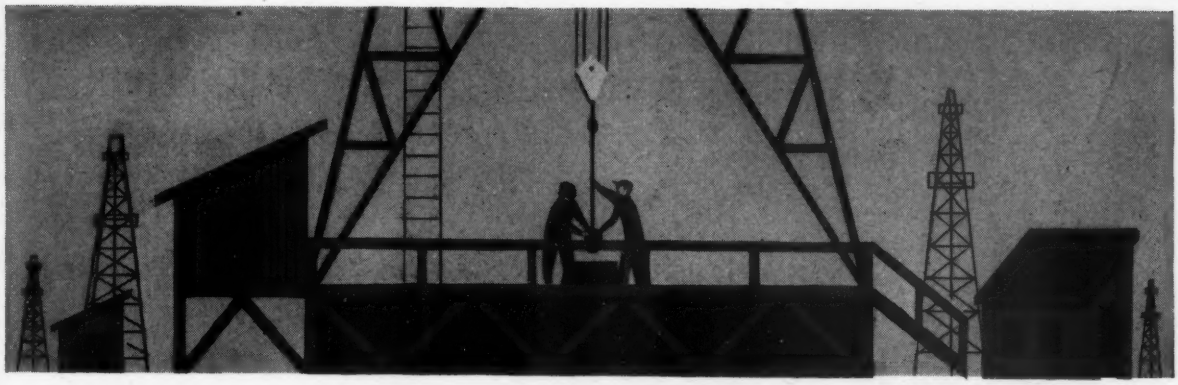

For **lumber** that has to LAST!

Use **penta**-chlorophenol *treated wood!*

Build for permanence with PENTAchlorophenol, the scientific, full strength wood preservative. Get positive, *tested* protection against decay and termites—protection, second to none, that lasts through the years. Reduce maintenance and rebuilding costs!

"PENTA" enables wood structures to withstand severe exposure—outdoor, underground and even under exceptional moisture conditions. It can be mixed with the proper oil solvent to permit painting after the wood has been treated. Workmen like PENTAchlorophenol-treated wood—it is clean and easy to handle.

Ask your lumber suppliers how you can take advantage of this modern wood treatment with its *deep penetration* and *measured control.* Or write to Dow for illustrated booklet No. PE 16.

DOW
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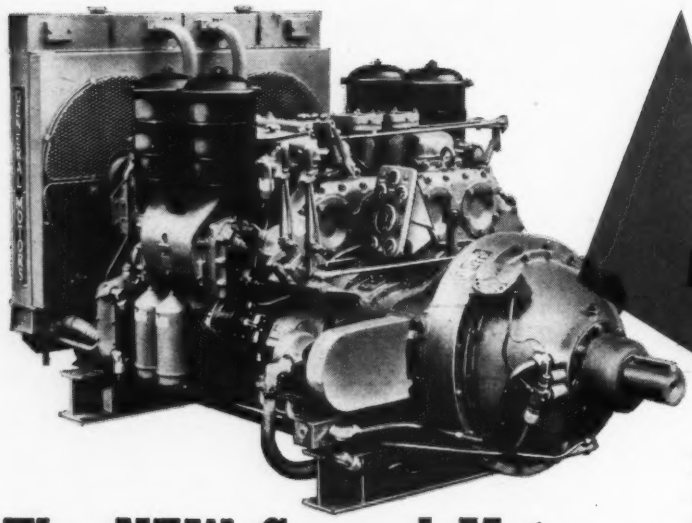
THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

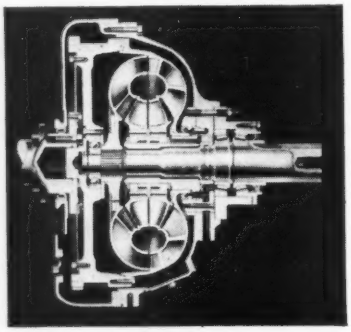


A Combination Torque Converter and Fluid Coupling *Integral with the Engine*

General Motors 71 Diesels equipped with the new GM Torque Converter take up no more space or weight than the same engines with conventional friction clutch and power take-off. Available in 3-, 4-, and 6-cylinder single engine units, Twin 4 and Twin 6 models having engine ratings from 75 to 300 H.P.

The NEW General Motors DIESEL ENGINE-TORQUE CONVERTER UNIT

HERE is a complete, integrated Diesel engine-torque converter unit that combines the inherent efficiency of the GM 2-cycle Diesel engine with the features and advantages of *both* torque converter and fluid coupling. It provides *torque multiplication up to 4 to 1* for starting variable heavy loads. It also provides *highly efficient transmission of power* during light load periods by *automatically shifting to fluid coupling* in the upper speed range.



In the new GM Torque Converter, oil does the work. Automatic transition from torque multiplication of 4:1 at stall to 1:1 in upper speed range.

A smooth, uninterrupted flow of power, delivered through a liquid, *prevents engine stalling* under any load and *protects both engine and driven machinery from sudden shocks.*

One Manufacturer—One Responsibility

Up to now most engines and hydraulic drives have been separate units. The result—compromise designs and divided responsibility. Now General Motors offers a new torque converter specifically designed and manufactured as an integral part of the General Motors Series 71 Diesel engine. It is a self-contained unit built by one manufacturer providing a long needed saving in space and weight as well as certain desirable operating characteristics not available before.

This new power unit will get the most work done in the least time because the engine operates in its most efficient speed range at all times—delivering maximum engine horsepower regardless of the speed of the load. *Maximum torque to start heavy loads PLUS maximum horsepower to keep the load moving.*

Everyone with a hard job to do in the oil fields, in construction, in mining or in logging should have all the facts about this compact, flexible GM Diesel Engine Torque Converter unit. *Write today for a complete description.*

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Seitz Machinery Company Inc. BILLINGS, MONTANA
Stewart & Stevenson Services Inc. HOUSTON 11, TEXAS
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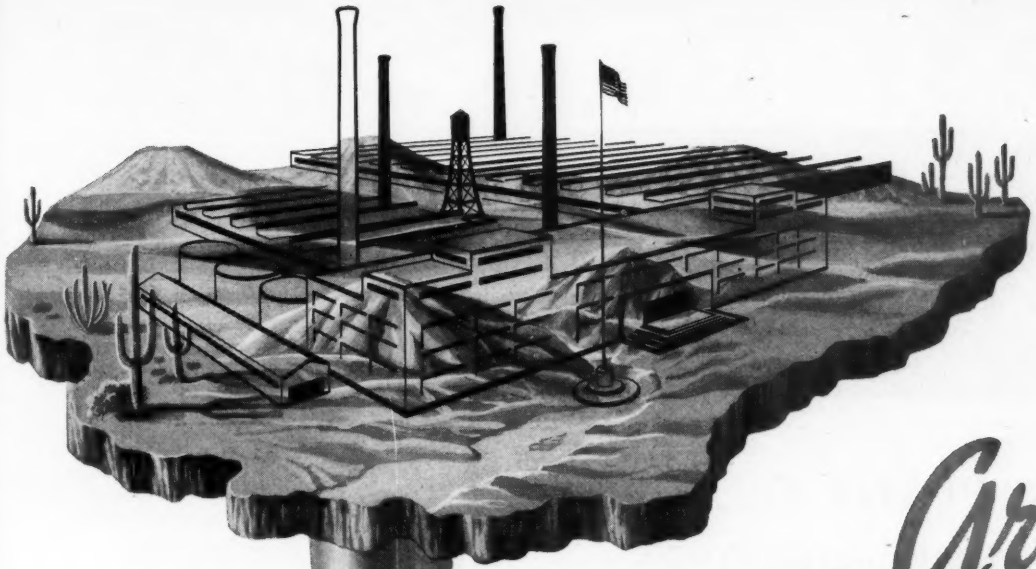

HOW TO MAKE PLANTS *Grow*

There is no secret to the fact that American Industry is on the march—experimenting, expanding, decentralizing. That's why, with less than one fifteenth of the world's land area and natural resources, America can produce one third of all the world's goods and services.

Time was when the location of a factory was limited by the proximity of a railroad, a river, a ready source of labor and of power.

Today, however, factories can literally be planted almost anywhere in the U.S.A.—thanks largely to modern developments in communication—and to the role played by ***steel pipe*** in serving the industrial needs of a nation.

In mines and quarries, in ships and trains, in far-flung factories, shops and mills, ***steel pipe,*** *length upon length and mile upon mile, serves as the arterial system through which flows the life-blood of Power, Energy and Materials that make American plants and American production grow.*

-pipe with the yearmark!

WHEATLAND TUBE COMPANY

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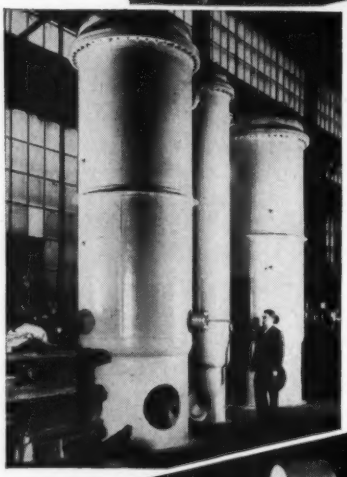
FOR PLANT DESIGNERS AND BUILDERS



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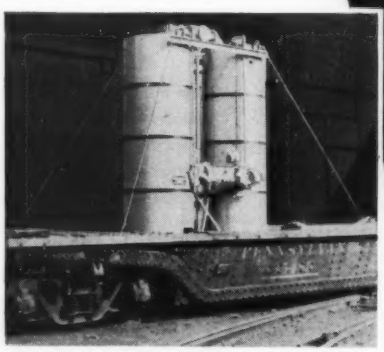

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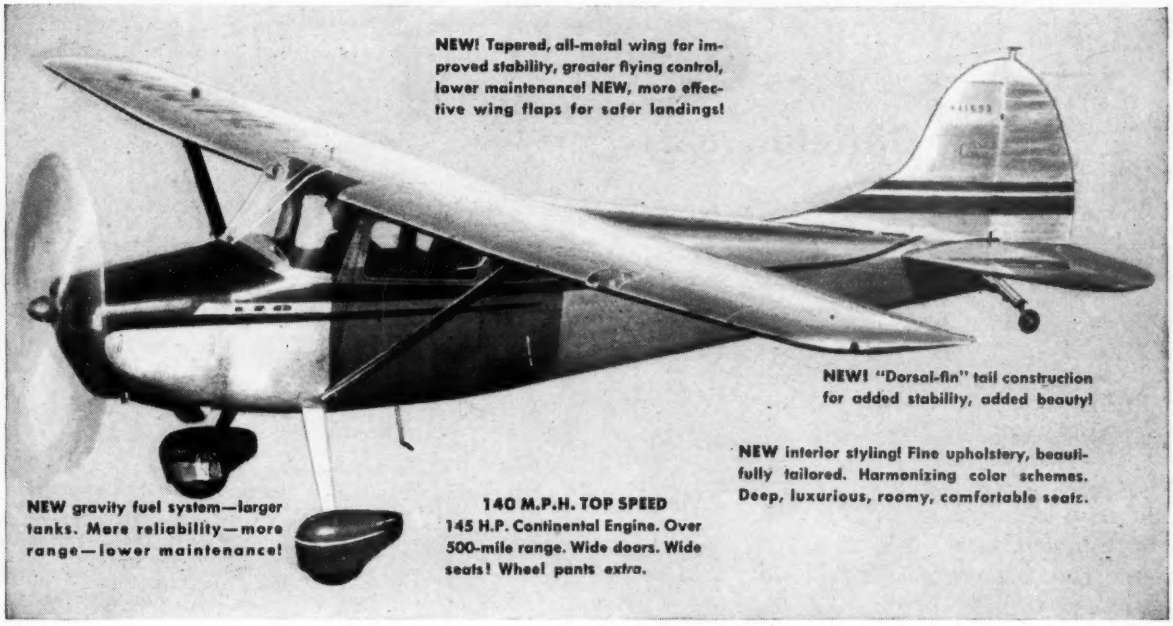
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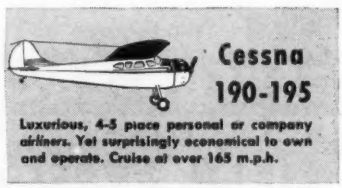

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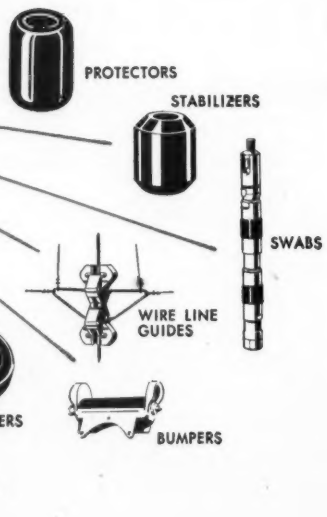

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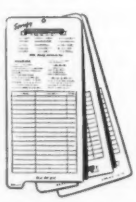

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Phone Wayside 7196

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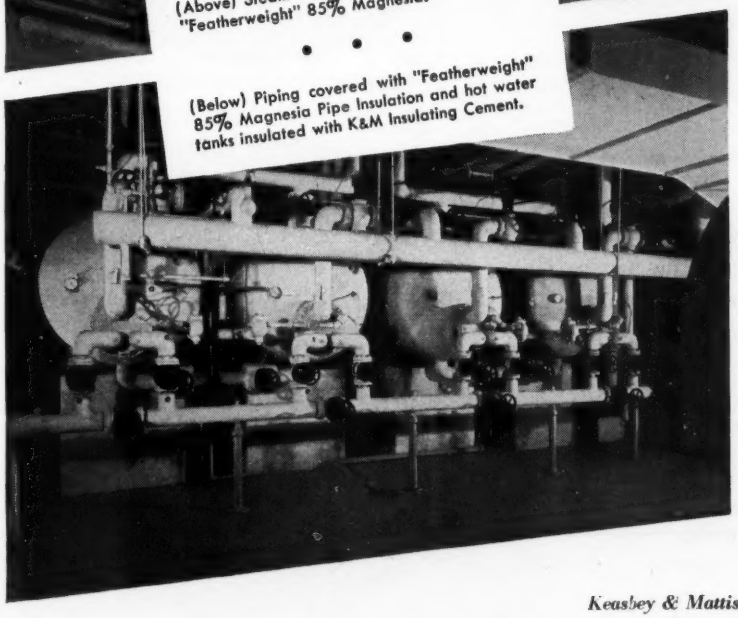
(Above) Steam lines are insulated with K&M "Featherweight" 85% Magnesia.

• • •

(Below) Piping covered with "Featherweight" 85% Magnesia Pipe Insulation and hot water tanks insulated with K&M Insulating Cement.



This imposing home office of the New England Mutual Life Insurance Company, Boston, is supplied with heat from a central heating plant.

The steam pipes are insulated with K&M "Featherweight" 85% Magnesia with the net result that heat losses are reduced to a minimum.

"Featherweight" 85% Magnesia insulation, first manufactured by K&M 62 years ago, combines the high insulating properties of basic Carbonate of Magnesia with Asbestos Fibre as a binding agent, forming a featherlight, fireproof, efficient insulating material.

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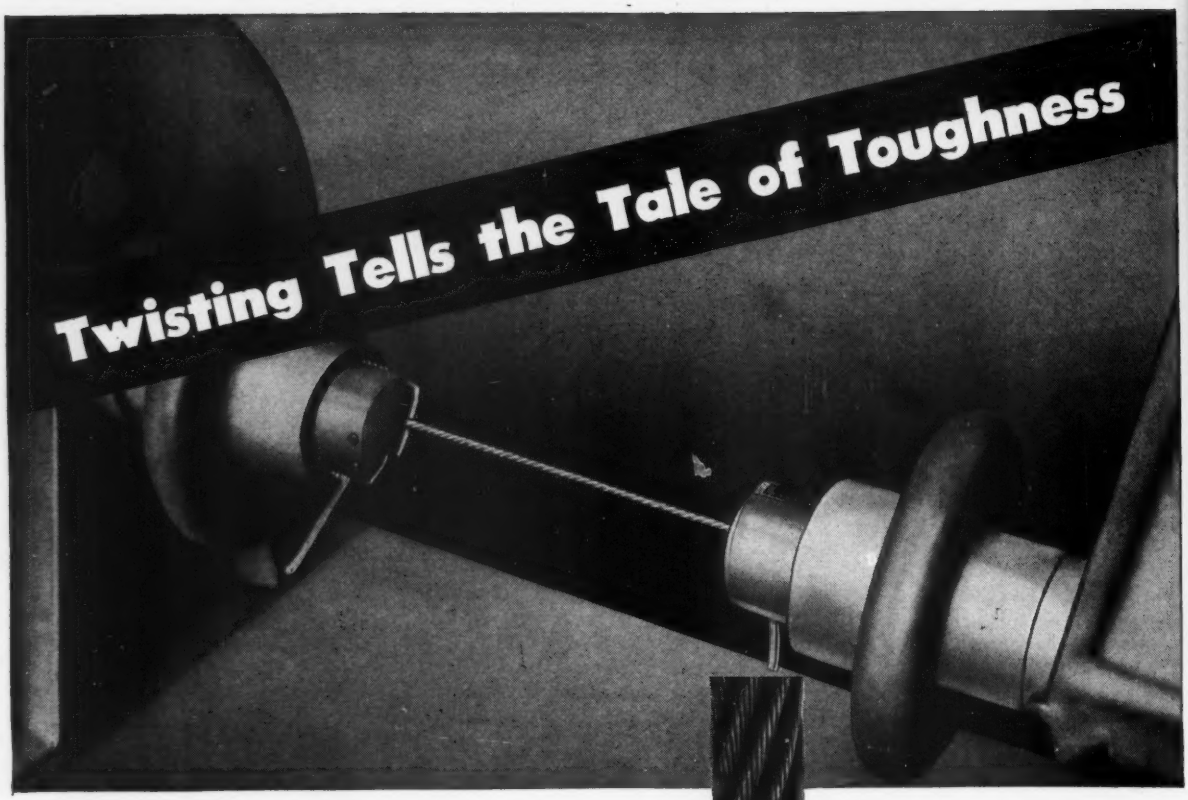

Here we see an 8" piece of rope wire being twisted on its own axis. The revolutions necessary to break the wire are counted and only those coils are accepted which test at least 10% above American Petroleum Institute specifications for wire rope. In addition to being an indication for toughness, the torsion test reveals whether the wire is free from steel defects such as seams and cups.

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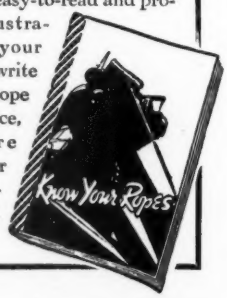

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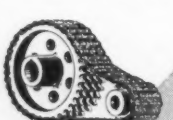
Send for your FREE copy of this time-saving wall chart of Oil Field Roller Chains. All you have to do is compare your worn roller chain with the corresponding drawing on the chart and order the new Baldwin-Rex Chain by number from your local supply store. Baldwin-Duckworth Division of Chain Belt Company, 357 Plainfield Street, Springfield 2, Mass.



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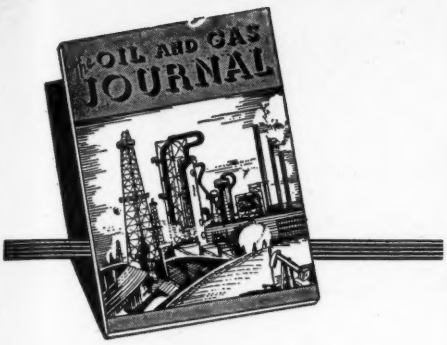

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JOURNALLY Speaking

Plucking the Goose

THE height of something or other is the proposal of the governor of Pennsylvania that the state's gasoline tax be raised 1 cent per gallon but that the oil companies absorb it.

In this way, he naively explained to the newspaper reporters, the state would have its additional revenue, the public would not have to pay any more, and the oil companies would simply drop their price back to where it was a year ago. Lovely.

The newspapers reported that "oil firms had no immediate comment." They probably were too dumfounded to speak.

When they recover their powers of speech they could point out to His Excellency that the price of gasoline went up for the same reason that the price of his government is going up; and that the tax is about as much as the gasoline itself is worth at the refinery; and that the public pays all taxes one way or another regardless of who purports to "absorb" it.

Taxation has been defined as the art of plucking the most feathers with the least squawks from the goose. If the oil industry doesn't squawk at this proposal it is a goose indeed.

It would appear that the oil industry has not done enough squawking about the gasoline tax all these years. Not only has it permitted gasoline to become the most highly taxed commodity but it has cheerfully served as tax collector, and without charge.

Now it is proposed that the industry stop annoying motorists with this bothersome collection business and just pay the tax itself. This would seem to be the last straw. At least it's adding insult to injury.

"Index Ready Soon"

IT'S always surprising as well as gratifying to learn how many people keep complete files of our favorite oil publication and want an index so they can find things in back issues easily.

Way last December, before our final 1948 issue was even printed, people began asking for an index. For several weeks now our news pages have carried a small blurb headed "Index Ready Soon." It didn't say how soon soon was, and some people are beginning to raise accusations of lack of truth in advertising. Actually, its purpose was to assure readers that we were working on it and also to get a line on demand so we would know how many to print.

Even though the actual indexing went on all during the year it was quite a task to put it into final form and get the type set. But now the job is about finished, and all you patient subscribers who have requested copies will be getting them soon and this time we mean soon. If you haven't asked, better do so pronto. It's free.

Yours for 50 Cents

HOW did you like the mass of statistics, charts, tables, and graphs we threw at you in our Annual Review and Forecast Issue January 27?

A lot of people liked it so well they wrote in for extra copies for their friends. One man ordered 25. Our canny circulation manager anticipated this, however, and laid in a supply of extras. While they last you can get them at four bits each, f.o.b. Tulsa.

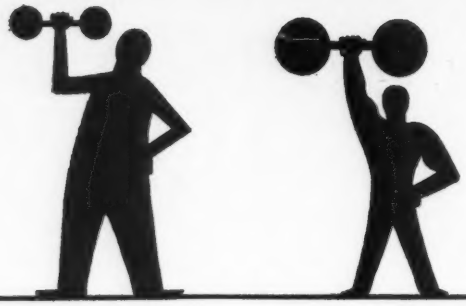
Some Like It

IN case you think we're kidding about some people liking that Annual Review issue, we modestly pass on quotes from a couple of letters that just came in:

"Send me half a dozen for distribution through our various departments who are always yelling for me to dig them up some figures. It is the same complete job we have expected from the Journal staff. It's a swell piece of work, and put together so the man who runs can read."

And this:

"I wish I could figure out how in the hell any one organization can gather, digest, and collate all of the technical data that your organization puts into its publication, and especially how you can get to work to put it into one issue. Frankly, I stand stricken dumb in mute admiration—my hat is off to you."



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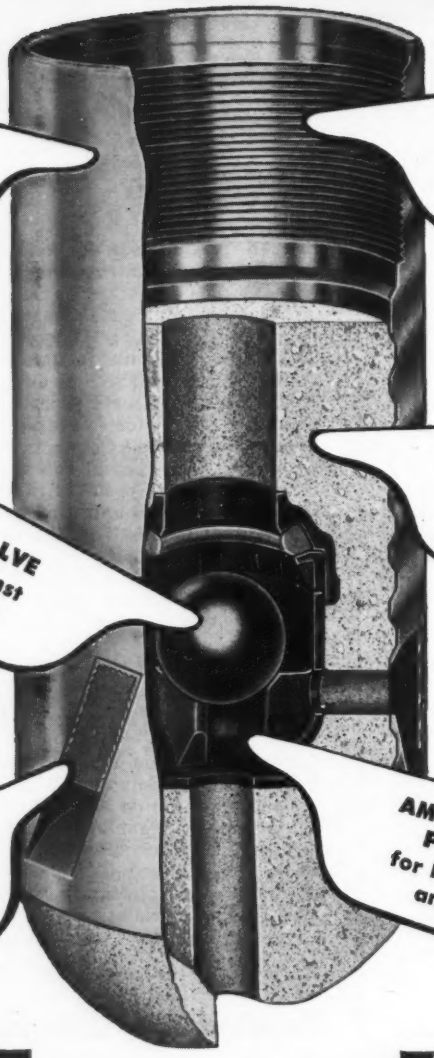

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CEMENT WASH-DOWN *Whirler* FLOAT SHOE

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Controlling Imports

THE importation of foreign oil into the United States is undoubtedly the subject most discussed by the entire petroleum industry at the moment. The volume of imports during the next few weeks will be a controlling factor in the production and perhaps the price of domestic crude.

Demands are being made in Washington that the Government increase import taxes or set up administrative machinery to limit imports by quotas or some mathematical formula. It will be difficult to convince Congress and the public of the necessity for this because the memory of an oil shortage is so recent. It will be hard to demonstrate how seriously the industry's economic position is affected by the relatively small shift in supply which changed scarcity to abundance.

So far the domestic industry has not actually been injured seriously by imports. The fear is that imports will continue at recent levels, or higher. In that case, it is pretty well agreed, within a few months stocks would climb to unwieldy levels, domestic production would be cut back sharply, the price of crude would fall, and operators would curtail exploration and drilling programs.

It is a fortunate fact that the bulk of our importing is in the hands of a small number of companies which have much larger stakes in their own domestic production than in their United States markets for foreign oil. These companies have it in their power to keep imports to a level which will fill only those requirements which domestic producers cannot meet by producing at rates which are sound from an engineering and economic standpoint—the objective of the import plank in the policy statement of the National Petroleum Council to which the entire industry subscribed.

Because of the antitrust laws it is not possible for this group of importers to get together and fix quotas, and this would not be desirable in any event. But each importer, acting individually in accordance with his sound business judgment, can reduce his own imports. And if he should err a bit on the side of domestic production there would be no harm done.

One large importer has already taken this step. If the others will follow suit the danger of oversupply will soon fade, and so will the clamor for government regulation.

Such enlightened self-interest is not at all illegal, and should be no more subject to criticism than price leadership by a major producer or marketer. If each big importer will establish his own operating schedule with primary regard to domestic conditions the adjustment of imports can be achieved easily, flexibly, and unobtrusively.

If this is not done there may be another law, another government bureau, interminable hearings in Washington, and permanent intrusion of politics in the oil business.

Landon Asks Truman for Action Putting Quotas on Oil Imports

A REQUEST that the Government impose quotas on the importation of foreign petroleum into the United States was made in a letter to President Truman this week by Alf M. Landon, an active independent oil producer, former governor of Kansas, and 1936 Republican candidate for President.

Landon's letter reflects views currently being expressed by many other oil producers, and the subject of oil imports is certain to receive considerable discussion in Washington during coming weeks. His request for action is based primarily on considerations of national defense, and he suggests that both importers and domestic producers should make certain sacrifices in order to build up a producing capacity in the United States in excess of current consumption requirements.

In his letter to the President, Landon said:

"Since the first part of 1948, crude-oil imports have climbed from 280,000 bbl. a day to nearly 500,000 bbl. daily at present.

"There has been, however, a decrease in the import of refined products, but even with that decrease the total import has increased 30.2 per cent as of November 30, 1948.

Fears Price Cut

"That is in striking contrast to the increase in demand for all petroleum products in 1948, which was only a few per cent over 1947. Under the impact of this volume of foreign oil, prices of some refined products have sagged, and the price of domestic crude oil is now softening. Lowered crude-oil prices would touch off a recession in the American oil industry, for the present price barely represents the replacement cost of oil produced under the present costs of labor, steel, and other essential materials.

"Aside from the economic factors involved, lower crude prices would be disastrous from the standpoint of national defense. It is a well-known fact that production and transportation of Middle East crude oil could not be maintained in the event of hostilities on any large scale. In such an event, neither we nor friendly European nations could benefit from these oil supplies. Furthermore, without access to Middle East oil, European nations would be forced to turn immediately to this country for their oil supply.

"I would never advocate that imports should be curtailed or eliminated simply to permit the producing of domestic oil at the fastest possible rate. But there is a middle course between excessive and inefficient drafts on our own oil reserves on one hand and excessive imports on the other. That course lies in closely regulated import quotas for foreign oil and in the strict observance of the principles of conservation in developing and producing domestic oil. Such a program, formulated with national security and economic welfare as its base, would require that some concessions be made by all interested groups. In light of the stability which this program would create, the cost of those concessions would be small compared with the losses which would result from uncontrolled imports.

"I am not one who would gut our oil stockpile simply to insure the American oil industry of high prices and earnings. In the event of a national emergency, that policy would plunge us into the same hole as depending upon excessive imports with its destruction of domestic production and exploration.

"I have supported the reciprocal trade agreements which meant an increase in imports of Venezuelan oil. About 2 years ago I told Mr. Averill Harriman, then Secretary of Commerce, that I was one oil producer who defended his grant of export licenses for steel in order to enable American companies to develop Middle East oil. I have believed reasonable development of foreign oil sup-

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Lift Controls From Oil Exports But Impose Them on Imports, Brown Urges

WASHINGTON.—A plea for the imposition of import controls on petroleum and for greater recognition of the needs of the domestic industry for tubular goods in fixing quotas for export was laid before the House and Senate banking committees last week by Russell B. Brown, general counsel of the Independent Petroleum Association of America, as Congress began consideration of President Truman's request for extension of the Export Act until June 30, 1951.

As Brown sped from one side of the Capitol to the other to testify before both committees on the same day, the Office of International Trade reportedly was putting finishing touches to a proposed order ending export control of oil.

Brown discussed the export-oil situation at length, telling the committees there is now no need for restrictions, so far as the supply of oil is concerned, but rather that the time has come when exports of domestic oil again should be encouraged.

And, he added, if the purpose of the legislation is to protect the domestic economy and the national security, it would be served best by a control over imports of oil, adding that "our welfare and safety are in jeopardy from unreasonable imports and a curtailed market for the domestic oil industry."

Pointing out that Texas, Oklahoma, and Kansas during the past 2 months cut back production allowables by approximately 350,000 bbl. a day, Brown explained that "at this time the matter of foreign petroleum trade involving both exports and imports is the most serious problem confronting the independent oil producer.

"Since the problem involves a commodity essential to our national security we feel it is a matter that should have the consideration of Congress wherever the question of foreign trade in oil is involved," he said.

"We recommend that the committee amend the pending bill so as to provide that imports of petroleum and petroleum products be limited to such amounts as will not endanger the nation's security and economic welfare, and to provide that imports shall be used only to supplement domestic production in meeting our national petroleum requirements."

Brown charged the Department of Commerce with disregarding the requirements of independent domestic producers for tubular goods, and cited testimony of one department official before a congressional committee that such consultations as were held when quotas were under consideration were with oil companies operating abroad as well as domestically, "as they were considered to be the best judges of where tubular goods were most needed."

Since the war, the export controls have been administered in a manner that has been highly injurious to the domestic industry, despite the fact that Congress continued export controls for the purpose of protecting domestic industry in regard to commodities in short supply, Brown told the committees.

"The facts indicated that export

(Continued on page 141)

C. W. TOMLINSON

T. A. LINK

H. N. TOLER

A. H. BELL

New A.A.P.G. Officers Chosen; Plans for Annual Meet Under Way

by Charles J. Deegan

THE new officers of the American Association of Petroleum Geologists, to take office at the end of the thirty-fourth annual meeting in St. Louis, March 17, have been announced by Paul Weaver, present president, after an official canvass of the mail ballots.

They are: C. W. Tomlinson, president; Theodore A. Link, vice president; Henry N. Toler, secretary-treasurer; and Alfred H. Bell, editor. The president-elect, Dr. Tomlinson, is an independent operator and consulting geologist from Ardmore, Okla. He has been an active member of the A.A.P.G. since 1921, having served on many committees through the years. He is a recognized authority on the complicated geological structure and stratigraphy of southern Oklahoma, and is the author of a number of major scientific articles published in the association's bulletin.

Officers Well Known

Theodore A. (Ted) Link, the vice president-elect, is one of the best known geologists in Canada, besides being widely known and respected in the United States and South America. For 21 years, from 1927 to 1948, he served as chief geologist for Imperial Oil, Ltd. Since resigning that position, he has been serving as a consulting geologist, and is in charge of directing the joint exploration program of a group composed of leading Canadian independents plus several major U. S. companies. Dr. Link is the author of 10 major scientific articles published in the A.A.P.G. Bulletin, and is recognized as a specialist in structural geology and stratigraphy. He, too, has been active for many years in association affairs.

Henry N. Toler, incoming secretary-treasurer, for 10 years has been manager of the geological and land department, Southern Natural Gas Co., at Jackson, Miss. Prior to that he served as Mississippi state oil and gas supervisor for 2 years, after promotion from assistant supervisor, in which office he had served for 5 years. He has been active on the association's committee for publication; the national service committee, the business committee, and as associate editor for the Eastern Gulf area.

Dr. Alfred H. Bell, head of the oil and gas division, Illinois Geological Survey, the new editor-elect, is widely known as a result of his many published articles on the petroleum geology of Illinois. He has been with the Illinois Survey since 1926 and is recognized as one of the outstanding authorities on the petroleum geology of that region. He has been at various times, a member of the following association committees: Business, publication, research, medal award, and statistics of exploratory drilling. In 1940 he was chairman of the program committee for the annual meeting at Chicago.

This week also the preliminary announcements were made by the three exploration societies on their joint annual meeting to be held March 14-17, at the Jefferson Hotel in St. Louis. Registration will begin on Sunday, March 13, for early arrivals. On Monday the Society of Exploration Geophysicists will hold technical sessions, while the geologists will have committee meetings. On Monday night there will be the customary open meeting of the research committee of the A.A.P.G.; the subject this year will be "Control of Petroleum Accumulation by Sedimentary Facies."

Heavy Program Planned

Tuesday will be a full day of joint sessions for all three societies, geologists, geophysicists, and paleontologists. Presidential addresses will be given and honor awards made during the morning, while the afternoon will be devoted to technical papers with a broad common interest.

Wednesday morning will have three separate technical sessions; the Society of Exploration Paleontologists and Mineralogists will have its first separate session on the "Quaternary of the Gulf of Mexico," while the geologists and geophysicists will have separate technical meetings. In the afternoon, the geophysicists will continue their separate meeting, while the S.E.P.M. will join the geologists for a symposium on limestone reefs.

Thursday will see the geophysicists taking trips to local educational and scientific institutions, while the paleontologists conduct a symposium on "Fundamental Problems in Paleontology." The geologists will have a morning program on areas outside the United States, and some miscellaneous papers in the afternoon, followed by the annual business meeting.

There will be a geological field trip on Friday and Saturday, after the convention, from St. Louis south to Cape Girardeau and return, down one side of the Mississippi and back on the other. Exposures of Paleozoic rocks will be visited under able guidance. This trip is jointly sponsored by the Missouri Geological Survey, the Illinois Geological Survey, and the Illinois Geological Society. The trip will be made in chartered buses, since arrangements do not permit use of personal cars.

Report on Tanker Orders Made by Shipbuilders

WASHINGTON.—Private shipyards in this country have 78 vessels of 1,000 gross tons or over scheduled for delivery during the next 2 years, 65 of which are tankers, it was reported last week by the Shipbuilders Council of America.

During the current year, 34 tankers of 560,360 gross tons are scheduled for delivery, and in 1950 another 30 of 510,640 gross tons are due to be completed. The only vessel now on shipyard books for delivery after December 31, 1950, is one tanker of 18,000 gross tons.

Ten of the tankers are to built at Bethlehem Steel Co.'s Quincy, Mass., yard and another 20 will be built at the same company's Sparrows Point, Md., yard. Ingalls Shipbuilding Co. is building 1 tanker for The Texas Co., and Newport News Shipbuilding & Drydock Co. is building 11, New York Shipbuilding Corp. 3, Sun Shipbuilding & Drydock Co. 15, and Welding Shipyard 5.

A total of 5 tankers are to be built for The Texas Co., 8 for foreign interests, 5 for Atlas Tankers, 6 for Gulf Oil Co., 4 for A.-C. Tankers Co., 14 for Standard Oil Co. (N.J.), 3 for Philadelphia Tankers, 7 for Tankers Navigation Co., 5 for National Bulk Carriers, and the remainder for Panamanian interests.

OGD Policy Review Is Demanded as Friedman Predicts Import Decline

WASHINGTON.—A complete report of all policy suggestions made by the Oil and Gas Division to other agencies was demanded this week by Chairman Joseph C. O'Mahoney of the Senate interstate and insular affairs committee, with a view to determining whether governmental bodies are using directives to make policies that should be written by Congress.

O'Mahoney indicated his distaste for government by directive, pointing out that the consideration and adoption of policies so dictated could be done behind closed doors with Congress, the public, and those affected kept in ignorance of what was going on. On the other hand, he said, when Congress wants to act, bills are written and distributed and committees make open studies, all with a view to informing the public what was being considered.

The committee called for the report after Robert E. Friedman, acting director testifying on the work of the OGD, had outlined the manner in which it is attempting to coordinate the oil activities of the Government.

No Authority Used

Friedman said that the OGD, which he pointed out has no mandatory authority over any other agency, has made numerous recommendations on policy, formally and informally, in an effort to see that the actions of the individual agencies accord with "a consistent over-all administrative course of action designed to effectuate congressional policy and to further the public interest."

While the OGD serves as an adviser to Congress, Friedman said, it has not found it necessary so far to make any recommendations for legislation although, he explained, had not unusual peacetime laws been in effect, such as those for export control and voluntary allocation agreements, it might have been necessary to urge action along those lines.

Discussing the current import situation, Friedman told the committee it is "problematical" whether imports will continue to increase.

Now that domestic production is more than adequate to demand, he said, "imports in all likelihood will fall off" in the course of time but "ultimately we will again become a net importer of oil."

In this respect, the OGD head differed with James Boyd, director of the Bureau of Mines, who told the committee last week that "recent trends indicate that we must increase our imports of petroleum products if industrial activity is to be maintained at its present high standard."

Boyd's statement drew fire from Sen. Robert S. Kerr of Oklahoma, who insisted the hearing record should show that "this is a matter of disputed accuracy," and O'Mahoney interrupted to declare there are many who say the same thing as the senator.

The present staff of the OGD, Friedman testified, totals 24 of whom only 8 are experts, and it is being handicapped in its work by lack of experts on foreign oil, gas, and other subjects. The basic problem in developing an adequate force, he explained, is limitation of funds and lack of cooperation from the industry in getting people who will take OGD jobs at the salaries the Government pays.

Sees Demand Increasing

Domestic demand for oil will reach the level of 7,000,000 bbl. daily in the not far distant future, Friedman testified, foreshadowing continued pressure on domestic reserves and their potential inadequacy before the much greater reserves of less highly developed areas have been similarly depleted. The implications of this situation emphasize the scope and importance of the oil problem, he declared, but inferentially he warned the committee against giving undue credence to claims that we are rushing head-first toward exhaustion of our fuel resources.

"The situation is one requiring serious consideration, not alarm," he said. "We are in no danger of running out of oil for many, many years; although at some earlier date we must expect to run short of natural petroleum. If we could be sure that peace would prevail in the world and that the oil industry would have opportunity and materials to expand its operations in both the Eastern and Western hemispheres, we could be certain that the oil needs of the world would be met for many years.

"In any event, there are excellent prospects for new oil discoveries in the United States and elsewhere in the Western Hemisphere. Ultimately synthetics can and will supply the bulk of our liquid fuels from resources that are to be found abundantly within our own borders. But the timely translation of these potentials into actualities will require great wisdom and energy on the part of both Government and industry, each in its appropriate sphere of action."

Supply of Steel Tubular Goods Appears Promising

FIRST signs of an easing in the tight supply of steel products for the oil industry are contained in reports from Pittsburgh that a few scattered cancellations of oil-country goods have been received by pipe mills.

Tonnage involved in the cancellations is said to be insignificant, but it is regarded as indicating that the current oversupply of many petroleum products and the weakening of oil markets is affecting the record-high tempo of oil-industry operations.

Some oil companies are said to be resurveying their programs in view of the present ample oil supplies. This situation, however, may change completely this spring when normal summer motor-fuel demand begins to be felt.

The scattered cancellations for tubular goods reported in Pittsburgh do not mean any material improvement in pipe supply as yet. The development, however, points to a decline in various high-cost pipe-procurement methods adopted by the oil industry. These include conversion deals and pulling casing from old wells for second-hand sale. The so-called gray market in oil-country pipe is known to have dropped off drastically in the last few months.

All this affects oil-country goods, principally casing and tubing, and the demand for line pipe, particularly of the larger sizes, continues apparently as heavy as ever. Continued large production, however, appears to be making headway against the backlog of orders for this type of pipe.

Last week, the first trainload of 30-in. pipe out of a total of 470,000 tons to be delivered left Los Angeles from Consolidated Western Steel Corp. for the Transcontinental Gas Pipe Line Corp. project. Republic Steel Corp. reported its new large-diameter mill at Gadsden, Ala., is producing at its 100,000-ton annual capacity earlier than expected.

Louisiana Sets Preliminary Allowable Hearing Feb. 15

HOUSTON.—A Louisiana allowable hearing preliminary to setting March and April oil and gas allowables will be held in the Monteleone Hotel in New Orleans February 15.

In announcing the hearing, S. L. Digby, commissioner of conservation, said hearings will be held at the same time on operations in Ada, South Shuteston, Egan, and Reddell fields. February 17 has been set as the date of a hearing in Marksville on proposed rules for the Marksville Wilcox sand.

this week

IMPORTS—Foreign oil is currently the major question facing the United States oil industry. . . . Some importers voluntarily reducing shipments. . . . Others urged to follow. . . . ¶Alf Landon urges President Truman to establish import quotas. . . . ¶I.P.A.A. suggests export controls be lifted, import controls imposed. . . .

REGULATION—Administration unveils its bill for federal regulation of tidelands. . . . Would cover entire Continental Shelf and marginal seas. . . . Provides for restricted private leasing. . . . ¶Krug presses measure for federal financing of synthetic-fuels plants. . . . Foresees crude shortage in near future. . . . ¶Senate committee probes OGD's influence on policies of other agencies. . . . ¶ECA cracks down on crude price overcharges. . . .

INTERNATIONAL—Pacific Western offers attractive terms for acquisition of Arabian half of Kuwait Nejd Neutral Zone. . . . Negotiations reported nearly complete. . . . Terms may affect concessions in other areas. . . . ¶Shell companies' production plus Kuwait purchases average 920,000 bbl. daily during 1948. . . . ¶Germany has hopes for future oil development after years of slow expansion. . . .

TRENDS—Daily average crude-oil production in U. S. dropped another 63,625 bbl. for week ended February 5 to average 5,363,125 bbl. for the week. . . . ¶Total crude-oil stocks increased 1,106,000 bbl. during week ended January 29 as daily average crude runs to stills dropped to 5,490,000 bbl. . . . ¶Refinery demand (production plus stock changes) for four major products during first 4 weeks in January was 3.7 per cent above the same period in 1948. . . . Gasoline demand 9.3 per cent above. . . . Kerosine demand 9.4 per cent below. . . . Distillate fuel demand 2.6 per cent above. . . . ¶High gasoline demand and low fuel consumption resulted from warmer weather in northeastern states. . . . Residual fuel demand increased 1.4 per cent over the same period last year. . . . ¶Refiners are cutting down runs to stills because of weakened heating and fuel-oil market. . . . Heavy fuel oil gets fourth reduction in recent months. . . .

PIPE LINES—Plans for pipe-line projects for crude oil, refined products, water, and natural gas in Venezuela under way by three major companies. . . . ¶Six-inch crude-oil pipe line under construction for Bolivian Government filled with gasoline as far as Zudanez in preparation for delivery to Sucre as soon as 45-mile, 4-in. Zudanez-Sucre lateral is completed. . . . ¶New record in line pipe looms for 1949 as 1948 production far surpasses output in 1947. . . . ¶FPC permits 6-month delay in start of Tennessee Natural Gas Co. line, due to shortage of pipe. . . .

REFINING—Standard Oil Co. of California's new wax plant at Richmond completed and in production. . . . Output expected to alleviate wax shortage on Pacific Coast. . . . ¶Pure enlarges Savannah port facilities, plans new lube blending, packaging plant. . . . ¶Peake says Standard Oil Co. (Ind.) refinery runs in 1948 were above expectations. . . . ¶Colorado's first catalytic cracking unit now on stream. . . . ¶New 40,000 M.c.f. per day gasoline-recovery plant for Barnsdall Oil Co. at Newhall, Calif., will be in production in June. . . .

With imports of foreign oil the burning question of the day, there is much interest in the new tanker fleet now building. Pictured here is the Esso Zurich, first of 14 supertankers ordered by Standard Oil Co. (N. J.), loading at Port Aransas, Tex., on its maiden voyage. Though in the domestic trade, the Zurich replaced an equivalent tonnage of older tankers for foreign registry. The 26,555-ton Zurich is 628 ft. long, has a speed of 16 knots, and a cargo capacity of 238,000 bbl. This exceeds by 100 ft. and 100,000 bbl. the size of the wartime T-2 tankers

Congress Gets Bill for Federal Regulation of All Offshore Oil

by Bertram F. Linz

WASHINGTON. — The administration bill for federal control of the tidelands oil resources was sent to Congress last week with a request for prompt enactment signed by Defense Secretary James V. Forrestal, Attorney General Tom C. Clark, and Secretary of the Interior J. A. Krug.

While similar in general to the measure unsuccessfully pressed last year, the newly proposed legislation makes no provision for the distribution of the income to be received by the federal Government from oil and gas operations. The three cabinet members suggested that Congress may wish to consider whether the states off whose shores operations under the legislation are conducted "have equities which justify the payment of some portion of the income to them."

Unless some provision is made for division of the income, all proceeds derived by the Government will go into the Treasury, it was pointed out.

Almost at the outset, the new bill provides that the President may at any time set aside any of the submerged coastal lands as national reserves, and in time of war the Government will have the right of first refusal to purchase any part or all of the oil or gas produced.

Old Claims Outlawed

In anticipation of future developments, the bill will apply to the entire Continental Shelf as well as to the tidelands involved in the Supreme Court's decision in the California case or which may be secured by the Government under the cases now pending against Texas and Louisiana or by future proceedings against other states.

One provision of the bill is intended as a safeguard against any conceivable claims to obtain, without compliance with the terms of the measure, permits or leases of tidelands deposits that may be asserted by persons who in the past filed applications with the Interior Department under the present Mineral Leasing Act.

It was explained there is no reason to think that the Attorney General's opinion holding such applications invalid can be successfully challenged in the courts, but it was held no substantial equity appears which would justify giving any such applications preferential consideration in the issuance of leases, and it was pointed out that many of them involve producing areas developed by lessees of California at great expense and under circumstances which may justify the issuance of exchange leases.

In general, leases both within and outside known geological structures of producing fields will be issued after competitive bidding to the responsible person offering the highest bonus, a departure, with respect to the latter, from the policy of the Mineral Leasing Act to grant leases to the first qualified applicant. This change is justified, it was contended, because operations in the submerged areas are much more expensive than on dry land and competitive bidding will discourage the purely speculative operator who does not really intend to develop the land.

Leases Restricted

The measure provides that the area of a lease not within a known structure or producing field shall not exceed 64,000 acres initially, and within 3 years must be reduced to not more than one-half the original area or 7,680 acres, whichever is larger, and by the end of the fifth lease year must be cut to 7,680 acres. Leases within known structures may not exceed 2,560 acres. The maximum acreage that can be held per person is set at 128,000 acres, of which not more than 30,720 acres may be held under producing leases, in any one of the three coastal regions: Pacific Ocean, Gulf of Mexico, and Atlantic Ocean.

Leases will be for a period of 5 years and so long thereafter as there is production in paying quantities, and in the absence of such production, off-structure leases may be given an extension of not more than 5 years upon proof that actual development work is costing at least $75,000, or such greater amount as the secretary may fix, has been carried out.

Until there is a discovery, off-structure lessees will pay a royalty of 25 cents per acre per annum for the fourth lease year and not less than 50 cents per annum thereafter. The royalty on production is not to be less than 12½ per cent of the amount or value of oil or gas produced, with a minimum royalty of not less than $1 per acre on off-structure leases, after discovery, in lieu of rental.

The conservation angle is covered by authority in the Secretary of the Interior to regulate the rate of prospecting and development by lessees, and the quantity and rate of production from leases, but where justified in the national interest he could fix such rates without strict regard for conservation or engineering practices.

All operations could be suspended or leases terminated in time of war or a national emergency, to facilitate complete control by the Government "of a resource essential to the national defense" and of coastal areas important from a defense standpoint. Holders of leases, however, would be entitled to compensation, it apparently being felt that unless this was provided for operators might refuse to take leases, retarding development.

For the relief of the coastal states and their lessees, the bill provides for the granting of exchange leases, the federal grant to be for a period not exceeding the unexpired portion of the term of the old lease, to cover, in whole or in part, the same area, and to provide for not less than the rentals, royalties, and other payments required under the state leases.

It is provided that if the commission which is to be set up to pass upon exchanges of leases, to consist of three members appointed by the President, determines against an exchange but believes that in fairness the applicant should be compensated for past expenditures, the matter is to be reported to Congress for consideration. Such an instance would arise, it was explained, where the issuance of a lease would be considered against the national interest but the applicant is felt to have substantial equities.

Specific provision is made in the bill to release any state, its political subdivisions or grantees, and those

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Long Joins Louisiana's Fight to Keep Tidelands

HOUSTON. — In a written statement, Louisiana's Gov. Earl K. Long, Huey's brother, said last week he would "join in any effort" to help his state retain title to the tidelands.

Long said, "I believe that every citizen of Louisiana is interested in our state's retaining title to the tidelands, and, as governor of this state, I certainly want our state to retain these rich oil properties. I know of nothing that I can do, other than cooperate with our national legislators and our attorney general, that will help in this matter.

Lt. Gov. W. J. Dodd added his bit in another statement in which he said, "I am interested in the state's retaining the oil-rich tidelands and will do anything within my power to help our state keep them. I am sure that everyone in this administration feels as I do about this matter."

Unitization Bill Minus Antitrust Features Offered in Texas Senate

by Leigh S. McCaslin, Jr.

HOUSTON. — A second unitization bill, without the antitrust features of the initial bill, has been introduced in the Texas Senate by Sen. Wardlow Lane of Center.

It is described by some as a counter bill to one introduced in the senate earlier by Sen. George Moffett of Chillicothe. Moffett calls for specific exemptions from the provisions of antitrust laws in the conduction of unit operations. It is this feature, in particular, which is drawing fire from opponents to the measure.

Senator Lane's bill is very similar to Moffett's with the exception of the antitrust feature. Lane says his proposal "just doesn't go quite as far" as the bill introduced earlier. The main feature of Lane's bill gives guardians, executors, and the state the right to enter into unitization agreements. Under present Texas law, this is prohibited. Moffett's bill contains this same proposal.

The North Texas Oil and Gas Asciation is the announced sponsor of the Moffett bill. The Texas Independent Producers and Royalty Owners Association have made strong public objections to it. Conjecture is rife that the T.I.P.R.O. is behind the Lane proposal as a counter measure to the Moffett bill. A bill similar to Moffett's was killed on the final day of the last Texas legislature.

Tidelands Action Sought

Public hearing on the Moffett bill will be held at 7:30 p.m. Monday, February 14 in Austin.

Other senate business for the week, of interest to the oil industry, included approval of a resolution delegating a member to meet with the executive committee of the Council of State Governments on the "tidelands" question. The delegate would discuss with the council the campaign started by the Texas Legislature to get two-thirds of the states to petition Congress for a constitutional convention. The proposed constitutional convention would be for the purpose of proposing a constitutional amendment giving the states clear title to the tidelands.

The senate also saw one of its members, Keith Kelly of Fort Worth, introduce a bill calling for reorganization of the state's tax structure. Purpose of the reorganization would be to eliminate "inequalities in the tax burden, confusion, and general unsound tax management and practices." Economy-minded Kelly earlier introduced a bill that would require the state to save $50,000,000 of its present surplus for a "rainy day." Interest of the oil industry is obvious since it carries a goodly portion of the state's tax burden.

At week's end, the house was just getting down to the business of introducing bills. The delay was caused primarily by the wait for committees to be appointed.

Gas Tax Bill Proposed

Only three bills, none pertaining to oil, were formally introduced by week's end, however, several bills pertinent to the industry were awaiting introduction. Rep. C. S. McClellan is offering a measure to place a production tax of 1 cent per 1,000 cu. ft. on natural gas. He estimates the state's revenue from such a tax at $30,000,000 annually. Money raised would be used primarily for improving rural roads.

A second proposed natural-gas tax is being sponsored by Rep. Deno Tufares of Wichita Falls. Tufares will ask for a tax of 1½ cents per 1,000 cu. ft. of gas at the wellhead. The estimated $42,000,000, which would be collected annually from such a tax, would be split among charitable institutions, rural schools, and rural roads. He claims it would be applied only to gatherers, and not affect producers and royalty owners. In a drawing among house members, Tufares won the right to introduce his measure as House Bill 30.

A measure making it unlawful for the buyer of mineral rights to retain them for longer than 10 years without drilling has been proposed. Its sponsor, Rep. Milton Wilkinson of Patroon, is asking that the mineral title go back to the surface owner of the land after this period. However, the mineral lessee would retain one-sixteenth royalty interest indefinitely.

House committee chairman appointments of particular interest to the oil industry include: Sterling W. Williams, Snyder lawyer, chairman; and Doyle Willis, Fort Worth lawyer, vice chairman, of the oil, gas, and mining committee; Joe B. Fleming, Henderson farmer, chairman, and T. M. Collie, Eastland lawyer, vice chairman, of the revenue and taxation committee. Fleming was the leader of the fight in the last legislature against the unitization bill.

Wallgren Named NSRB Head to Replace Steelman

WASHINGTON.—President Truman last week named Mon C. Wallgren, former governor of Washington, to be chairman of the National Security Resources Board, relieving John R. Steelman, presidential assistant, who took over in December when Arthur M. Hill quit following a reported dispute in the board over policy.

The President told a news conference that Wallgren is particularly fitted for the job of planning mobilization of industry in the event of war by reason of his experience on the Senate War Investigating Committee, on which he served when Truman, as a senator, was chairman.

The changes in the $14,000-a-year top post on the NSRB arose out of differences in the board over the extent to which it should interfere in the peacetime economy of the country. Hill reportedly wanted the board to be a peacetime War Production Board, with complete authority over materials and, in event of need, prices and other factors, whereas other members held that the National Defense Act, creating the board, contemplated that its activities should be limited to planning emergency mobilization.

There have been numerous suggestions that in the event Congress grants the President the allocation and price-control authority he has requested, the board would be named as the agency to administer it. There was some support for this view in the President's announcement that Steelman would take over temporarily "to undertake the important job of continuing to fit the work of the board and the activities of its staff into the broader framework of total presidential responsibilities."

Acheson Seeks Approval Of Bogota Charter

WASHINGTON. — Prompt ratification of the charter of the Organization of American States was asked of the Senate foreign relations committee last week by Secretary of State Dean Acheson.

Acheson explained that the charter represents the results of 3 years of work on reorganization of the machinery which had been developed over a period of years for cooperative action by the American republics on common problems.

The charter was put into final form at a conference at Bogota, Colombia, last summer, at which a number of agreements were adopted, including one on petroleum. *(The Oil and Gas Journal, January 27, page 159).*

WORLD-WIDE OIL DEVELOPMENTS

Negotiations by Pacific Western For Kuwait Concession Progress

PACIFIC WESTERN OIL CORP. is reported concluding arrangements to buy the Arabian half of the Kuwait Nejd Neutral Zone concession in an agreement offering considerably more than has previously been given any Middle East government.

Terms provide a royalty of 55 cents a barrel—some 20 cents more than the highest prevailing elsewhere in the Persian Gulf area—a 25 per cent stock participation in the company by Saudi Arabia, and a $9,500,000 bonus with a $1,000,000 guaranteed annual payment.

Pacific Western, an operating company with producing properties in California, the Rocky Mountains, and the Southwest, is controlled by J. P. Getty, Santa Monica, Calif., the president of the company.

The company itself has made no statement on its negotiations for half of the neutral zone, but Pacific Western's representatives are understood to be in Saudi Arabia at this time working out final details. The deal was described as agreed on, but not yet formally consummated.

The Nejd Neutral Zone is a small section of desert territory bordering on the upper Persian Gulf between Kuwait and Saudi Arabia. It has a maximum length of about 50 miles east and west and an average width of about 45 miles.

Last July, American Independent Oil Co., which was organized a year earlier by Phillips Petroleum Co., and a group of independents, obtained the Kuwait undivided half interest. This company is reported to now have a party of geologists in Kuwait preparing to make preliminary surveys of the neutral-zone area.

Though the Nejd Neutral Zone is regarded as probably the most favorable Persian Gulf territory not fully under concession rights, the high price being paid by Pacific Western for the Arabian half surprised experienced oil officials in New York.

The $1,000,000 guaranteed annual payment is reported provided for until the royalty reaches that figure. The $9,500,000 bonus payment contrasts with a bonus of more than $7,000,000 which was reported paid by American Independent to the Sheik of Kuwait.

The reports of the terms of the Pacific Western-Saudi Arabian agreement were disturbing to officials of other companies operating in the Persian Gulf area. Demands on oil companies from governments have become increasingly heavy, and the Pacific Western deal, if closed as expected, is regarded as likely to have unfavorable repercussions in other areas. The Iranian Government is preparing to open negotiations with Anglo-Iranian Oil Co., Ltd., on revised concessions terms, and similar discussions were recently under way in Iraq between the government and Iraq Petroleum Co., Ltd.

The 55-cent-a-barrel royalty reported agreed on by Pacific Western compares with the $2.50 a ton, or about 35 cents a barrel provided by American Independent for Kuwait. The other feature, government stock participation, represents a government proposal which most American oil companies have successfully resisted elsewhere in the past.

Over the past year, various other American companies have been reported considering entering an offer for the Arabian half of the neutral zone. American Independent won its rights from the Sheik of Kuwait over a field of nine other bidders.

Much of the interest in the neutral zone results from its proximity to the prolific Burghan field in Kuwait which is now producing about 200,000 bbl. daily with reserves, proved and indicated, of some 11 billion barrels. This field is only about 20 miles north of the neutral-zone border. Arabian American Oil Co. producing fields are south of the zone in Saudi Arabia.

The conclusion of the Pacific Western deal presumably will make necessary operating partnership between the company and American Independent. This is due to the fact that the zone is held by Kuwait and Saudi Arabia on an undivided interest basis with no geographical division. The reported provision for 25 per cent Saudi Arabian stock participation indicates a new company would be formed by Pacific Western to carry out the operation.

Pacific Western 1947 production, all in the United States, was 3,698,755 bbl. Pacific Western's producing acreage at the beginning of 1948 totaled 4,817 with 476 producing wells. The company holds 641,808 shares of Mission Corp., Ltd., and about 9 per cent stock interest in Tide Water Associated Oil Co.

Moffett Suit Against Aramco Goes to Court

Jury trial of the $6,000,000 suit brought against Arabian American Oil Co. by James A. Moffett opened last week in federal court in New York.

Moffett, former oil-company official who was connected with the federal Government during the Roosevelt administration, claims that as a result of his intervention with various officials in Washington during the war, the financial demands of King Ibn Saud of Saudi Arabia were met by Great Britain, thus saving Arabian American $30,000,000 it would otherwise have had to pay.

Moffett told his story in full from the witness stand last week, and the trial was expected to continue at least another week. Aramco's defense attorney, in his opening statement, said Moffett was never retained for the purpose he alleges but volunteered to go to Washington since he was chairman of the board of an Aramco subsidiary and vitally interested in the matter. In any case, the attorney said, Moffett's efforts were unsuccessful.

Germany Strives for Increased Oil Development to Meet Country's Needs

by Lester S. Thompson

1. Introduction

ALTHOUGH insignificant when compared with American standards, local oil production is an important factor in present-day German economy. It is obvious that the more Germany can produce from within its own borders, the less will have to be supplied from foreign sources. Small though it may be, it is still a contribution toward self sufficiency of that country.

The present rate of production, about 14,000 bbl. per day, accounts for roughly one-quarter of Germany's internal requirements. How long it may continue to maintain this position depends on a variety of factors. With increasing industrial activity and, it is hoped, attendant increase in prosperity, the internal demand is bound to grow. At the same time, it is doubtful whether indigenous production can be materially increased.

Even to maintain the present rate one must anticipate new discoveries. These will depend on the results of exploratory drilling, and the past record of wildcatting has been most discouraging from the economic standpoint. Of more than a thousand exploration wells drilled during the past 15 years, only 23 were successful. But many German oil men display unqualified optimism and, whether or not economic, it is probable that the production of petroleum will be carried on for at least several decades. Historically the picture is not too attractive. The oil seepage at Nienhagen was mentioned in Agricola's De Re Metallica, but there was no attempt at commercial exploitation until the discovery of Wietze field in 1874. Further developments proceeded slowly and during the following 45 years only three additional fields were brought in, all fairly close together in the Hannover basin. In the late 1920's, German oil attracted the interest of foreign capital, largely American, both on the part of major companies and of independents. The rise to power of the Nationalist Socialist party, however, brought this phase of activity to an end. It was not until the period of intensive exploration initiated in the middle 1930's and subsidized to a great extent by the central government that the great increase in new discoveries was effected.

International
WORLD-WIDE OIL DEVELOPMENTS

The slowness of expansion was due to some extent to ineptitude on the part of the Germans in oil finding and to an apparent fear of venturing into the unknown. Economic factors also had a bearing on the subject. Exploration and development work have always been costly due to primitive drilling technique. It was not until the early 1930's that up-to-date rotary rigs began to come into use, and even today the German driller can hardly be said to have mastered the use of this equipment. At the present time, operators are further handicapped by worn-out and defective equipment and the difficulty of getting replacements. The uncertainty of geological factors has also increased the hazards of exploratory drilling. Social problems such as housing, feeding, clothing, and transporting workmen have retarded the development program in some of the outlying areas.

With the exception of two minor fields in Baden (combined production 45,000 bbl. per year) present German production is confined to the North German Plain and hence lies entirely within the British zone of occupation. Until the establishment of bipartite control, little more than 1 year ago, the task of rehabilitating the petroleum production

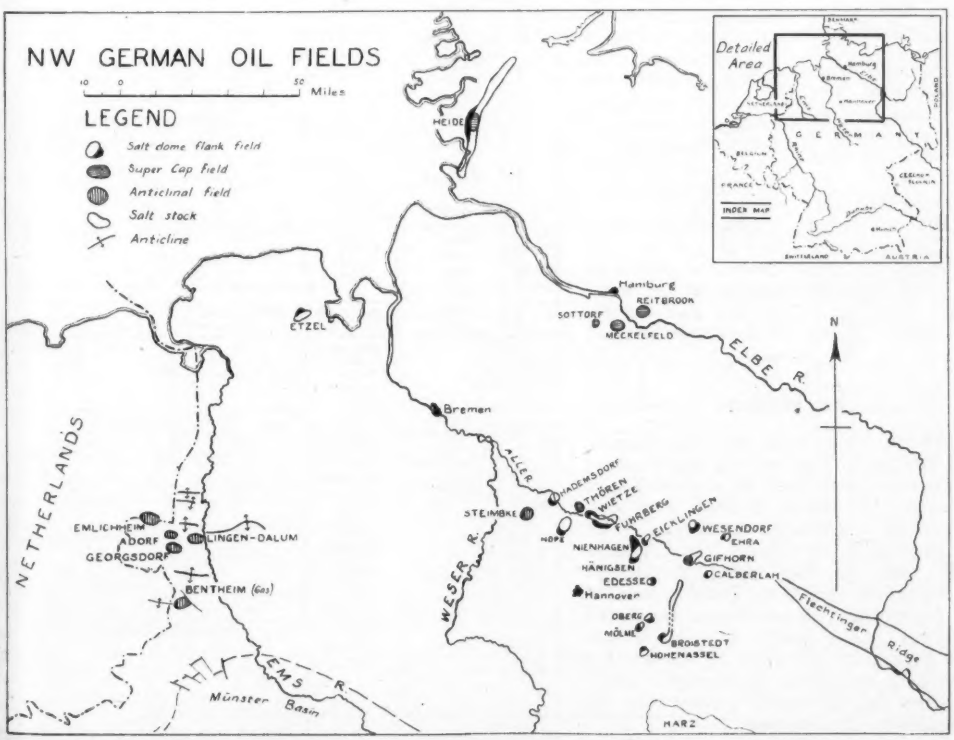

Fig. 1—The North German Plain area—source of the country's major production

industry fell to the British. Credit is due the able staff of the North German Oil Control for bringing production up to a figure not only substantially in excess of any prewar year but equal to wartime production except for the 2 years 1940-41 when forced effort was the rule without regard for ultimate recovery.

General Geology

The geology of North Germany has been too thoroughly treated in several excellent scientific publications to warrant a complete review in the present paper. The following brief outline will, however, serve to demonstrate the mode of oil occurrence. In this connection, it must be borne in mind that surface geology is out of the question. Except in a few isolated localities, chiefly near the southern border, the North German Plain is obscured by a cover of Pleistocene-to-Recent accumulations often several hundred feet thick—glacial drift, alluvium, peat bogs, and sand dunes. One is, therefore, forced to rely on well logs and the results of geophysical surveys for the data from which to piece together the stratigraphic and structural picture of this most complex area.

Stratigraphy. — The accompanying geological column demonstrates the fact that practically every European stratigraphic stage from Carboniferous to Recent is represented in North Germany. Owing to numerous uplifts and marine transgressions, profound unconformities are encountered as wells as great variations in thickness. What may be an important formation in some localities will be totally lacking in others. The figures given in the column represent the maximum known thickness within the area. At any given point, therefore, the thickness may be anything from zero up to the figure indicated. The lithology also can be taken only as a broad indication as considerable lateral variation is encountered over comparatively short distances.

History.—As far as concerns oil-impounding structures, one may begin the tectonic history in Carboniferous time with the establishment of two major structural trends, one roughly northwest-southeast and the other generally northeast-southwest. These trends by no means follow straight lines and considerable variations in strike occur. At the close of the Carboniferous, the ancient mountains which extended into the area of the present North German Plain underwent peneplaination, furnishing the material for the lower Permian red beds. These are essentially terrestrial deposits which pass to a marine facies in the north. In upper Permian time, further subsidence gave rise to marine basins in which were deposited the Zechstein. This vast accumulation of rock salt and other products of evaporation has an important bearing on the later structural history of the area in the formation of salt domes.

A general uplift which took place during the Rhaetic accentuated the old Carboniferous structural lines. This was followed by minor movements in Upper Jurassic which resulted in the gentle rise to the east and north known as the Pompecky platform and also in the formation of the Hannover basin which is of great importance in connection with North German oil. During Upper Cretaceous time, this situation was reversed. The Pompecky platform subsided so that, over its area, one finds a complete sequence of Upper Cretaceous sediments. At the same time, the Hannover basin became an area of uplift. These movements continued into the Tertiary.

Structure. — The most conspicuous type of structure in northwest Germany is the salt domes. Some 250 major salt structures are known within the area. Of this total, only 18 have been at all thoroughly tested and have yielded 23 of Germany's 31 oil fields. This figure includes the defunct fields of Fallstein, Hope, Sottorf, and Horst-Wipshausen. Twenty-odd more salt structures have been partially explored by drilling without signal success.

It is beyond the scope of this paper to enter into a detailed discussion of

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GEOLOGICAL COLUMN — Northwest Germany

Age		Formation		Principal Lithology	Max. Thickness Feet	Oil and Gas Occurrence
QUAT.		Recent Pleistocene		Sand, Gravel Glacial Till		
TERTIARY		Pliocene Miocene Oligocene Eocene Paleocene		Sand, Clay Sand, Clay Sand, Clay Sand, Lignite Marl, Shale	1300 950 800 330 600	Neuengamme Gas Reitbrook
CRETACEOUS	Upper	Senonian	(Mucronat. Quadrat. Granulat.	Chalk	660	Reitbrook, Meckelfeld, Sottorf, Wietze, Hambuhren (Nienhagen)
		Emscherian Turonian Cenomanian		Marl Limestone Marl	900 990 200	
	Lower	Gault	Albian Aptian	Shale	1300	(Horst - Wipshausen)
		Neocomian	Barremian Hauterivian Valendis	Shale Sandstone, Shale	1300	Eicklingen, Meckelfeld Eicklingen, Emlichheim, Georgsdorf, Lingen-Dalum, Adorf, Hanigsen, Nienhagen
		Wealden		Sandstone, Shale		Braistedt, Olheim, Eicklingen, Giffhorn, Molme, Hademstorf, Hanigsen, Lingen, Nienhagen, Oberg, Steimbke, Thoren, Wietze
JURASSIC	Malm	Portland Kimmeridge Oxford		Limestone, Marl, Gypsum, Rocksalt Limestone Limestone	1640	Steimbke - Rodewald Hohenassel, Molme
	Dogger	Callovian Bathonian Bajocian Aalenian		Shale Sandstone, Shale Sandstone, Shale Bit. Shale	800	Fuhrberg, Hambuhren, Nienhagen, Steimke, Thoren, Wietze
	Lias	Toarcian Domerian Pliensbach. Lotharing Sinemur. Hettangian		Shale	980	Ehra, Oberg, Wesendorf, Calberlah (Nienhagen, Molme, Eddesse)
TRIASSIC	Keuper	Rhaetic Gypskeuper Lettenkohle		Sandstone, Shale Marl, Gypsum, Rock salt, Sandstone Dolomite, Standstone	1300	Eddesse, Berkhopen - Olheim, Molme, Nienhagen, Wietze Nienhagen
	Muschelkalk	Upper Middle Lower		Limestone Dolomite, Gypsum Limestone	980	
	Bunt-sandstein	Red Middle Lower		Sandstone, Shale	5500	Braistedt
PERMIAN	Zechstein	Upper		Rock salt, Potash, Gypsum Anhydrite Shale		Bentheim (Gas)
		Middle	Stinkschiefer Hauptdolomite Anhydrite	Dolomite Anhydrite	3000	Heide - Meldorf, Volkenroda, Fallstein
		Lower	Zechsteinkalk Kupferschiefer Conglomerate	Limestone Bitum. Shale Conglomerate		Heide - Meldorf
	Red Beds	(Rotliegend)		Sandstone Porphyry Rock salt Sandstone Gypsum Porphyry Sandstone Shale	?	Not an igneous rock. So called because of superficial resemblance
CARBONIFEROUS	Upper			Coal Sandstone Shale		Oil Shows in Munster Basin
	Lower					

The Author

Lester S. Thompson, who has contributed articles to The Oil and Gas Journal on previous occasions, is a graduate of Columbia University School of Mines. He served as geologist for a number of oil companies in Iran, Iraq, Arabia, Africa, and the West Indies. In 1930-31 he made an intensive investigation of the occurrence of petroleum in North Germany. As a major during the war he was in charge of all petroleum activities of the Persian Gulf Command. He recently completed an 8-month study of the German oil industry and its future possibilities for the U. S. Military Government in Germany.

salt tectonics. The principal salt beds involved are those of the Zechstein (upper Permian) which are the thickest and most widespread in Germany. In some places, however, such as Heide, the red beds of the lower Permian form the core of the domes. In the Hannover basin, the salt plugs appear largely to have been squeezed up through shattered zones at the intersection of anticlinal folds. The form here most typical approximates circular, although this is not universally true. As a general rule, the diameters of the salt plugs vary from 2 to 5 miles. In the north, especially in Schleswig-Holstein, the tendency is to follow simple structural trends with the resultant form of a long, relatively narrow salt stock, some of which attain lengths up to 35 miles.

Two types of salt dome are in evidence — the piercement type where the salt plug has penetrated all of the overlying beds up to the surface, and, somewhat rarer, the semipiercement type where the salt stock has penetrated only the deeper strata and bowed up the overlying formations into more properly a true "dome" form. Reitbrook and Meckelfeld with production from beds in the domed capping are examples of semipiercement structures.

In the piercement type, the bent-up beds surrounding the central salt stock are, as a rule, very much shattered and broken into relatively small fault blocks. Oil is impounded in the uptilted beds either against the salt itself or, more frequently, against fault planes. As a result, oil occurrences are limited for the most part to small, isolated pockets which are quite unpredictable and to which geological and geophysical work affords little if any clue. Often, in an active field, a well offsetting a producer may find the productive horizon faulted out whereas the next location beyond may encounter it. Also the fact that a given sand may be productive on one flank of a structure is no guaranty that it will be oil-bearing or even exist on another flank. (Fig. 2).

In the semipiercement type, in the cases where production is obtained from the domed beds overlying the salt rock, conditions are much simpler. Faulting can be fairly extensive, but it is by no means the serious factor that it is in the piercement type.

A third type of structure which has produced oil in North Germany is the simple anticline in which salt tectonics are not involved. Steimbke in the western part of the Hannover basin and Fallsein (now abandoned) are examples of older fields on this type of structure. To the present, the most significant developments on structures of this sort have been in Emsland, that extreme western portion of the North German Plain lying between the Ems River and the Netherlands boundary. Here, the typical structure is a broad, gentle anticline. So far, within this area, 10 structures of this type have been determined by geophysical prospecting. Four are now being exploited and the remainder tested by drilling. Although the flanks of these folds have been subjected to a certain amount of normal faulting, there are by no means the shattering and other complications characteristic of the salt dome area. (Fig. 3). It is probable that these or similar structures persist across the area between the Ems and Weser rivers.

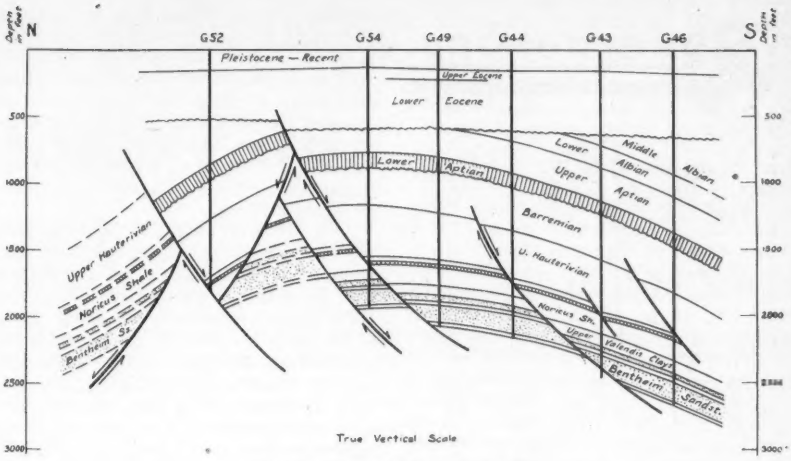

Fig. 3—Georgsdorf cross section

Oil occurrence.—Shows of oil have been found in North Germany in 18 different formations ranging in age from Upper Carboniferous to Eocene. There are in all 25 producing sands although rarely more than 2 are encountered in any one field. To date, more than half of the total production of Germany has been derived from the Wealden and Valendis (Lower Cretaceous). With the anticipated increase of output from Emsland, this proportion will be increased. Roughly 10 per cent of the total has come from the Dogger and the Malm (Jurassic). The Rhaetic (Upper Triassic) and middle Zechstein dolomite (upper Permian) have each accounted for similar quantities.

In general, the Senonian (Upper Cretaceous) has not been a major producer. Reitbrook, near Hamburg, is the outstanding exception. This field, discovered as recently as 1937, has yielded 10 per cent of the total German oil production to date. The Carboniferous has been tested in only a few scattered locations in the Muenster basin. Shows of oil have been reported in some of these tests, but nothing of commercial importance has yet been found.

The geographical distribution of the oil fields is fairly general over the area. The chief concentration of developments has been in the Hannover basin, generally along the strike of the Aller River which follows an old Hercynian structural line. This localization of effort was due largely to natural expansion from the older fields of Wietze, Nienhagen and Eddesse. In 1935, Heide, 100 miles to the north in Schleswig-Holstein, was brought in, to be followed shortly aft-

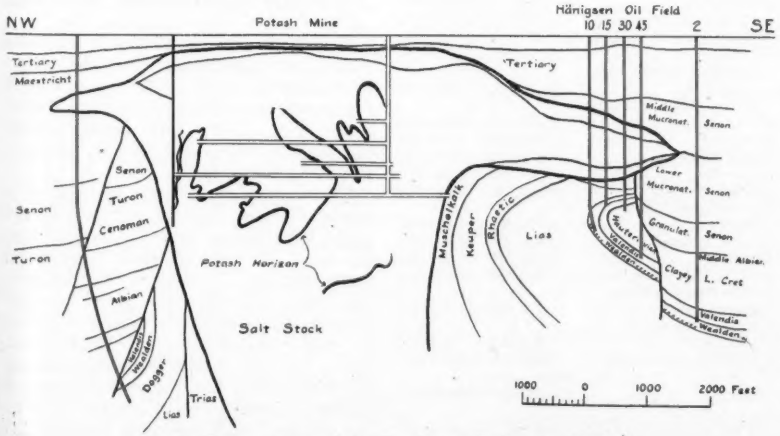

Fig. 2—Cross section of the Nienhagen-Hanigsen salt dome

er by Reitbrook, Sottorf and Meckelfeld in the area around Hamburg.

What appear to be the most important discoveries to date were made in the early 1940's near the Holland border, roughly 100 miles west of the old Hannover district. As a general picture, then, we have four widely scattered productive areas with undeveloped gaps of from 50 to 100 miles between. It is reasonable to assume additional occurrences of petroleum in the intermediate areas. Structural and stratigraphic conditions appear to be favorable. Whether the necessary exploration work is economically justifiable is a moot question which will be discussed later.

Geophysical prospecting. — The entire area has been covered at one time or other by regional and, to some extent, detailed surveys with torsion balance, gravimeter and magnetometer. Regional refraction seismic surveys have also been conducted. The coverage has been quite thorough and it is doubtful whether further exploration by these methods will yield results of appreciable value. Recently, a deep reflection seismographic survey employing two instruments of the latest model has been initiated under the direction of the geological survey (Landesamt fuer Bodenforschung).

The primary objective of this survey is to explore Emsland and the area between the Ems and the Weser for deep-lying structures. The results of this work should serve as a guide and also as a tie in for detailed geophysical surveys to be conducted by the interested producing companies. Detailed reflection surveys are also being conducted by private companies in the search for local "highs" on the anticlines between known salt domes. This work has not progressed sufficiently to draw any general conclusions. The results in the area between Steimbke and Hademstorf are said to be favorable and three exploration wells are planned.

(A second installment of this article covering Germany's production and geological conditions peculiar to the country will be seen in an early issue of The Oil and Gas Journal.)

Report Shows Shell Companies Play Big Role in World Output

WORLD-WIDE production of crude oil and natural gasoline by the Royal Dutch Shell group of associated companies together with the group's purchases of Kuwait oil in 1948 averaged an estimated 920,000 bbl. daily.

The year's total of 338,100,000 bbl. compares with 271,620,000 bbl. in 1947 and 219,774,000 bbl. in 1946. The 1948 total amounts to about 10 per cent of world production outside Russia and Russian-dominated areas, and if the United States and Canada are excluded, the group's figures are approximately 22 per cent of the total.

These figures and other data on the group's operations were distributed to Venezuelan Oil Concessions, Ltd., stockholders in connection with the current Shell proposal to acquire the minority V.O.C. stock of approximately 27 per cent. Two shares of Shell Transport & Trading Co., Ltd., are being offered by Anglo-Saxon Petroleum Co., Ltd., one of the group's principal holding and operating companies, for each minority V.O.C. share, and Shell Transport & Trading recently authorized 10,000,000 additional shares, about half of which will be used for the V.O.C. acquisition.

The estimated 1948 production figures placed the purchases of Kuwait oil under the long-term contract between Shell and Kuwait Oil Co., Ltd., at 18,000,000 bbl. The figures included the joint production in Egypt of the associated Anglo-Egyptian Oilfields, Ltd., and Socony-Vacuum Oil Co., Inc. Figures for Romania and Austria (about 10,000,000 bbl. in 1946) were omitted "in view of the group's uncertain future position in these countries."

Production by group companies and companies in which the group has a substantial interest—

(In barrels)

	1947	1948 (est.)
Venezuela:		
Caribbean Pet. Co.	22,223,000	26,700,000
Nederlandsche Olie Mij.	17,351,000	18,000,000
Venezuelan Oil Concessions	94,310,000	115,000,000
Colon Development Co., Ltd.	4,662,000	4,200,000
Trinidad	5,102,000	5,400,000
Argentina	3,930,000	3,700,000
Colombia	4,780,000	6,300,000
United States	76,705,000	86,000,000
Netherlands East Indies	6,767,000	16,000,000
British Borneo	12,970,000	20,200,000
Egypt	9,300,000	11,400,000
Iraq (group share)	7,557,000	5,300,000
Netherlands (group share)	739,000	1,700,000
Germany (group share)	214,000	200,000
Kuwait (purchases)	5,010,000	18,000,000
Total	271,620,000	338,100,000

The statement pointed out that important extensions to the group's refining capacity in the United Kingdom and elsewhere were under way in 1948. It estimated that in the first 9 months of 1948 crude processed in group refineries outside the United States and Canada or in refineries in which the group has a substantial interest, averaged about 90,000 metric tons daily (about 630,000 bbl. daily) and said about 94,000 tons daily was programmed for the last quarter.

The tanker fleet owned by the Shell group as of November 30 totaled about 2,000,000 tons with 23 additional tankers of 216,000 tons on order and arrangements made for the long-term charter of about 1,216,000 tons also under construction or on order.

As for marketing, the estimated group share of sales for 1948 outside the United States and Canada totaled 33,600,000 tons or about 28½ per cent of estimated total world sales outside the United States, Canada, Russia, and Russian-dominated areas.

In proposing the stock exchange, the Shell directors considered it desirable that a company as important to group operations as V.O.C. should become a wholly owned group subsidiary. Its entire production is purchased under contract by associated group companies.

In the third quarter of 1948, production of V.O.C. was approximately 30,000,000 bbl. as compared with about 27,500,000 bbl. for each of the first two quarters. Increased production has been obtained primarily from La Paz field which, the statement said, has just about reached its highest level commensurate with good production practice.

Regarding exploration, V.O.C. obtained successful results at Conception where deep test C-148 was completed for 1,900 bbl. daily from limestone, and recently encouraging tests have been made in S-5 at Sibucara between Conception and Maracaibo where limestone oil formations have also been found but at great depth.

Syrian Government Group Advises Agreement Revision

Revision of agreements dealing with Iraq Petroleum Co., Ltd., pipeline rights and with exploration rights of the affiliated Syrian Petroleum Co., Ltd., has been recommended by a special Syrian Government commission.

The commission was appointed to study statutes for oil companies operating in Syria, and the report was its first. It said a new agreement with Syrian Petroleum "safeguarding the interests of both parties" should be negotiated and submitted to the parliament for ratification. Syria has no production, but Syrian Petroleum Co. holds rights to 150,000 sq. km. of the country's total of 171,104 sq. km., and has done some wildcatting.

XUM

Krug Asks Government Financing Of Private Synthetics Plants

WASHINGTON.—Immediate development of a synthetic-liquid-fuels industry, government financed but privately owned and operated, was strongly urged by Secretary of the Interior J. A. Krug last week in his annual report to Congress on the Bureau of Mines research and development program in that field.

Government loans for construction of plants, contemplated in legislation offered but not acted upon last year and already reintroduced in Congress, would accelerate the founding of an industry offering an assured supply of oil adequate "for centuries," Krug declared.

The secretary estimated that 5 to 10 years would be required to develop any significant productive capacity for synthetic fuels, a period that makes it imperative the work be started before an emergency, military or economic, arises.

Krug supported his recommendation primarily on two grounds:

The United States last year became a net importer of oil, he said, and military and economic risks are great if we rely too heavily upon foreign oil for our future needs.

Sees Discoveries Dropping

On the other hand, virtually half of our oil came from 111 major domestic fields and it is apparent that new large fields must be discovered as rapidly, at least, as our older ones lose capacity, but from 1940 through 1947 only eight fields with estimated reserves of 100,000,000 bbl. or more each were discovered and proved. Further drilling in existing fields will prove reserves far larger than those now shown, Krug admitted, but without a pronounced increase in the number of new major discoveries, he said, the prospects for maintaining domestic production over any long period are not encouraging.

Krug indicated that the alternative to synthetic-fuels development is restrictions on the use of oil, to which he is opposed, and he asserted that technical progress, plus the increased cost of discovering and producing petroleum, has markedly narrowed the cost differential between natural and synthetic products.

The report outlined the progress which was made during the year in the various phases of the bureau's synthetic research.

Studies on coal hydrogenation at the Louisiana, Mo., demonstration plants, it said, indicated that a 30,000-bbl.-per-day plant could produce gasoline at costs ranging from 12 to 15 cents per gallon if credit is taken for byproduct liquefied petroleum gas at 8 cents a gallon, or about 4 cents a gallon less if credit also is taken for phenols at 10 cents a pound. In Colorado, further core drilling has substantiated early estimates that the western part of the state alone contains 200 billion barrels of recoverable shale oil.

The report also disclosed that the Department of Agriculture, which is cooperating in the synthetic-fuels program, has made considerable progress in the production of alcohol and other liquid fuels from such agricultural residues as corncobs and cottonseed, oat, and rice hulls, and a patent has been issued covering, with seven claims, the several stages of the hydrolyzation process which is being employed. A survey of Illinois has disclosed that state can furnish well over 1,500,000 tons of corncobs.

Meanwhile, the bureau said, its work on secondary recovery conducted with part of the funds provided under the synthetic-fuels program may make available, if as successful as expected, millions of barrels of oil now considered economically unrecoverable, and improved refining processes will make additional millions of barrels of low-grade crudes available in the form of better-grade products.

TVA to Complete Fluorine Plant Soon

WASHINGTON.—A substantial addition to the nation's limited supplies of natural fluorspar, from which fluorine compounds such as oil-cracking catalysts are made, is promised by the Tennessee Valley Authority upon completion of a $200,000 fluorine-recovery system to remove fluorine from the stack gases of TVA's two experimental furnaces producing fused tricalcium phosphate fertilizer at Columbia, Tenn.

The project is scheduled for completion early this summer, and will not only remove fluorine from the escaping gases but produce a marketable byproduct in the form of calcium fluoride or synthetic fluorspar, TVA officials say.

The recovery process consists of passing furnace-stack gas through a tower filled with lump limestone at temperatures in the range of 200° to 900° F. Fluorine, mainly in the form of hydrogen fluoride, reacts with the limestone to form calcum fluoride which is separated from the partially reacted limestone by screening.

Although TVA's production of synthetic fluorspar will be only a small percentage of the total needed by the country, it will demonstrate one method of reclaiming fluorine from phosphate rock. The country's reserves of natural fluorspar, now mined in southern Illinois and Kentucky, are limited, it was said.

Holaday to Head Special Military-Fuels Committee

WASHINGTON.—A special committee to determine policies on research and development in the field of military fuels and lubricants, succeeding the panel on petroleum which was set up for that purpose last June, has been organized by the Research and Development Board of the National Military Establishment.

W. M. Holaday, director of research for Socony-Vacuum Oil Co., Inc., has been named chairman of the committee, which held its first meeting this week.

The committee's responsibilities include consideration of organic and inorganic liquid, solid, and gaseous fuels, lubricating agents, hydraulic fluids, instrument oils, and antifreeze compounds. It also will study equipment and techniques for production, storage and handling, and dispensing.

In addition to Holaday, the committee will have two civilian members who had not been appointed prior to the meeting. The government members are Maj. Gen. H. B. Saylor, chief of the ordnance research and development division of the Office of Ordnance; Lieut. Col. John D. Hines, chief of the fuels and lubricants branch of the supply division of the Quartermaster General's Office, representing the Army; Capt. W. A. Hickey, head of the materials development branch of the research division of the Bureau of Ships, and Capt. A. L. Baird, head of the power plant division of the Bureau of Aeronautics, for the Navy; and Col. Marvin C. Demler, director of research and development, and Ewell C. Phillips of the engineering division of the Air Materiel Command, for the Air Force.

The secretariat of the committee will consist of Col. James A. McKerley, Air Force secretary; Lieut. Col. Fred L. Whittlesey, Army secretary, and R. A. Ide, civilian member.

Gasification Project Ready

The second underground gasification experiment by the U. S. Bureau of Mines and Alabama Power Co., at Gorgas, Ala., is substantially complete, and will be fired following a week of public inspection beginning February 14, according to an announcement made by the bureau.

Murray Disputes Senate Charges On Abuse of Conservation Laws

HOUSTON. — Replying to criticism of the United States Senate small business committee, Texas Railroad Commission Chairman William J. Murray, Jr., last week said, "I think a really amazing program of conservation has been inaugurated since the war and is probably being carried out as rapidly as the material situation permits."

Murray defended Texas conservation efforts and said that the commission "is doing everything in its power to expedite the program." He added, "I am not excusing the wastage of gas nor excusing the delay which has taken place in effecting a conservation program, but I believe any fair appraisal of the picture in Texas requires giving due credit to the bright spots as well as criticism of the black spots."

Sixteen of the seventeen fields involved in the commission's November shutdown orders are now utilizing 100 per cent of their residue, Murray stated. A gas-conservation program is to be completed within a few months in the seventeeth field—Levelland in Hockley County. Austin courts granted oil operators injunctions in all 17 of the fields so that producing operations continue despite the shutdown orders. A test case—that for Heyser field—is before the State Supreme Court.

Commission member Ernest O. Thompson backed Murray up publicly during the week with strong criticism of the Senate committee. In essence, he said that eliminating all gas flaring would have prevented production of oil which was vitally needed during 1946 and 1947.

He stated, "The subcommittee takes us to task for not shutting in flare gas from oil wells long ago. This would have made the oil shortage of 1946 and 1947, which they complain about, even worse. To shut in gas, would shut off the oil. That's why we did not cut off the gas waste sooner. As soon as oil production met demand, we did order flaring of oil-well gas stopped. We are vigorously fighting at the courthouse to prevent the waste of oil-well gas."

Thompson added a remark that the Senate committee appeared confused when it criticized Texas for flaring too much gas, and at the same time for producing too little oil in 1946 and 1947.

The Texas proration law limiting production to market demand was defended by Thompson as a "good law." He hit at the present import rate in saying, "Month after month, oil production was increased until December 1948, when we found it necessary to reduce production because of the flood of imported oil coming into the United States taking the market formerly filled by Texas."

Commerce Officials Urge Clarification Of Court's Ruling on Pricing Systems

WASHINGTON.—Commerce department and Federal Trade Commission officials differ sharply over the necessity for legislation to clarify the situation created by the Supreme Court decision prohibiting the use of basing-point pricing systems in the Cement Institute case.

While Trade Commissioner Ewin L. Davis stiffly opposed legislation now under consideration by a Senate Interstate Commerce subcommittee designed to make it clear that a seller may absorb transportation costs or sell at the same price as competitors, where no price conspiracy exists, Secretary of Commerce Charles Sawyer told the subcommittee that American business has shown such remarkable resiliency in adjusting itself to new situations that he finds it highly disturbing that the court decision has created a problem which business men do not know what to do with.

Davis stuck to the position which the trade commissioners, with the exception of Lowell Mason, have consistently held, that there is no necessity for any legislation. Seeking to impress the subcommittee with the commission's open-mindedness, he testified that no cases involving prices were brought unless there was evidence of collusion and said that in the case of two industries the FTC had been unable to find that evidence.

Sawyer, however, indicated he was less concerned with pricing systems as such than with the effect of the present situation on industry. In some cases, he asserted, the elimination of basing point pricing may tend toward local monopoly by protecting producers against competition from other areas, and in others may require the relocation of plants which had been located in the light of delivered pricing systems. On the other hand, he admitted, the practice of quoting delivered prices for commodities where shipping costs are substantial sometimes results in cross-hauling, which is wasteful of transportation.

"Perhaps, after careful study," Sawyer suggested, "specific rules could be worked out which would prohibit those forms of freight absorption which promote undesirable cross-hauling and undesirable uniformity of pricing formulas and would at the same time permit freight absorption to the extent necessary to encourage competition and avoid unnecessary differentials between customers.

"However," he added, "under American concepts of free enterprise, the decision as to what form of pricing practice to follow, subject to restrictions with respect to conspiracy, coercion, discrimination, and other unfair practices, should be left to the judgment of individual business enterprises made in the light of market conditions."

Sawyer also supported provisions of the bill which would amend the Robinson-Patman Act to permit sellers to charge different prices to different customers where necessary to meet competition, even to the extent of cutting under competitors, if such differentials are customary.

As the situation is now, he said, some business men feel that they are confronted with a choice between violating the Robinson-Patman Act by charging different prices to different customers or violating the antitrust laws by charging uniform delivered prices.

Texas Railroad Commission Announces Oil Hearings

HOUSTON. — Public hearings announced by the Texas Railroad Commission during the week included the following:

February 15—Projected reduction of allowable for World field, Crockett County.

February 15—Application of Humble Oil & Refining Co. to repressure with casinghead gas Pickton field, Hopkins County.

February 16—Hearing to determine if South Houston field, Harris County; Fig Ridge field, Chambers County; and Green Branch field, McMullen County, should be exempt from shutdown days.

February 16—Possible reduction of allowable for wells in Bartlett field, Jones County.

February 23 — Application of The Texas Co. for consolidation of Ganado, Ganado Deep, Mayo, and Harmon fields, all in Jackson County.

WASHINGTON WATCHING

BY BERTRAM F. LINZ

Still on the Pan

WASHINGTON.—The oil industry's all-out effort to bring supply into balance with demand has eliminated all chance of legislation based on shortage, but new threats of congressional action have been raised which are of primary importance.

On the same basis of long-range economic planning on which President Truman built his legislative program, congressional committees in the near future will give attention to oil issues of fundamental importance to the oil industry.

These issues will involve such things as divorcement of production and refining from transportation and marketing; imports; and, of course, tidelands and synthetic fuels. All of these may be involved in any discussion of national oil policy that takes place this year, but, with the exception of imports, all are covered in specific bills already introduced.

The administration viewpoint on all of these subjects already has been made clear.

The Department of Justice has pushed divorcement through the courts in the case of the film industry, the structure of which closely parallels that of the oil industry. The National Defense and Interior departments have strongly supported oil imports on the ground of conservation of our own resources. An extensive and expensive program of synthetic fuels development has been under way for several years, and there is no need to labor the administration's position on the tidelands.

The main point to remember is that, with no immediate emergencies before it for the first time in 16 years, Congress has the time, opportunity, and inclination to do some long-range tinkering with the economy, a point to which the administration has been leading it by the hand since March 4, 1933.

Better Bureau Business

IF the Hoover commission on government organization accomplishes nothing else, its work will bring out some little-known but important facts regarding the federal set-up—important because they have a bearing on the taxes which every oil man and every other individual in the country must pay to support bureaucracy.

The oil industry is painfully aware that there are some 30-odd agencies in the Government which one way or another have an interest in the business, but asked how many bureaus, commissions, divisions, etc., there are in the Government as a whole, the average man probably would say off-handedly a couple of hundred.

Before the reshufflings and additions of the New Deal, it is true, there were only about 350, but today there are a clean 1,800 and since there aren't enough problems to give each of them one for itself it is necessary for several to work the same side of the street.

Thus, while some 30 agencies are interested in oil, just about the same number are engaged in lending money, making guarantees, or in insurance activities. There are 23 agencies engaged in major construction activities competing with each other for labor and materials and scattered over 11 departments or agencies. There are 10 dealing with major transportation questions, not including the Interstate Commerce Commission.

It isn't only the taxpayer who doesn't know how many government agencies he is supporting, there is no agreement even in the Government as to the number that report direct to the President. One list shows 65, another 94, and a third 101, and there are "somewhere between 45 and 80" (nobody knows just how many) that may not report to anyone.

The idea behind reorganization of the government is precisely that which motivates a lot of corporate reorganizations—to squeeze out a heck of a lot of water which somehow has seeped in through the years. Coupled with decent business management, which it never has had, that should mean important savings to the taxpayers. If that is ever accomplished Washington will be known as Utopia, D. C.

Dismal Oscar

UNDERSECRETARY of the Interior Oscar L. Chapman gave the Senate interior affairs committee a peek into the future last week, and what he showed practically posed the question, where do we go from here?

If we use up as little as one-half as much more over the next 30 years as the increase of the past 30 years in minerals and oil, Chapman said, we are either going to have to scour the world for imports, close down the factories, or turn the country into a huge laboratory for the development of synthetics and substitutes.

Unless we are going to depend upon foreign supplies to a dangerous extent, we will have to find vast new reserves of oil and metals, devise practical methods of using low-grade ores, and develop substitutes not only for petroleum but also for copper, lead, zinc, and other materials.

The theme of Chapman's discourse, was the importance of giving his Interior Department a free hand, first of all to undertake a billion-dollar, 20-year inventory of our natural resources, which, he said, would cost nothing if the department could keep the scarcity prices of basic resources from going up by as little as 5 per cent through finding more minerals and oil, or by helping to make synthetic oil possible, or by bringing in more power and then more aluminum and copper.

The committee's investigation, undertaken, according to Chairman Joseph C. O'Mahoney of Wyoming, in search of an improved policy for the conservation, development, and administration of our natural resources, incidentally is drawing criticism from Republicans, who charge it is a smoke screen intended to minimize an expectedly highly critical report on the department by the Hoover commission.

Stuck in a Conduit

CHANCES of enactment this year of legislation clarifying the basing-point situation have dimmed somewhat as a result of an announcement by the Supreme Court that it will review the decision of the Seventh Circuit Court of Appeals in the so-called rigid conduit case.

Involved in that case is one of the important points which would be covered by the proposed legislation—the legality of use of a basing-point pricing system by a company knowing that other concerns use a similar system.

The case came to the high court on appeal by the defendants in which the Federal Trade Commission, which had initiated the proceedings, concurred because of the public interest involved, following a decision holding that the rigid steel conduit manufacturers had violated the antitrust laws, both by using a uniform delivered price system and by conspiring to fix prices through use of their basing-point system.

Following the Supreme Court decision in the Cement Institute case, where it outlawed basing-point pricing systems developed by consultation between competitors, a Senate subcommittee began consideration of legislation designed to define pricing systems which could be adopted legally.

During the course of hearings on the legislation, Federal Trade Com-

mission officials contended that they instituted pricing cases only where there was evidence of price-fixing or collusion, but industry spokesmen countered by pointing out that in the rigid conduit case the commission raised the question whether a seller may independently make use of a basing-point pricing system, knowing that competitors are using the same system, but without agreement, combination, or conspiracy, or discrimination in prices.

Because the Supreme Court decision on this point may serve to allay the confusion resulting from its decision in the Cement Institute case, it is probable that Congress will not take final action on legislation until an opinion has been handed down. That decision probably will not come before late May or early June, when the court prepares to end its term, or may be delayed until next fall, since the case is not expected to be reached for argument before April.

Labor Law Lags

A DOZEN senators, led by Irving M. Ives of New York, supported by southern members, may in effect write the new labor legislation now before Congress on the floor of the Senate.

Hearings before both Senate and House committees, with the foregone conclusion that CIO demands for repeal of the Taft-Hartley Act and substitution, almost untouched, of the Wagner Labor Relations Act, would be O.K.'d, have been marked less by argument between committees and witnesses over the legislation itself than by the almost incessant heckling of each other by Republican and Democratic members.

During the hearings, Republicans warned that the legislation would be written on the floor rather than in committee, and advocates of a law that would retain many of the Taft-Hartley provisions are confident that they can get them in as amendments to the administration bill when it comes up for debate.

Ives controls the votes of a number of senators from the New England states, plus one, each, from New Jersey, Minnesota, North Dakota, and California. Two Republicans are an unknown quantity, there being no foretelling what position William Langer of North Dakota and Wayne Morse of Oregon will take when it comes to a showdown.

A number of southern Democrats are expected to work with the Republicans in putting important Taft-Hartley provisions into the Wagner Act, and the coalition is seen as sufficiently strong to put its plans over.

The situation in the House, however, is very uncertain and much will depend upon whether the bill is brought in under a rule, which would foreclose amendments, or is considered under the 5-minute rule, which would leave the way open for attack. In the past, Speaker Rayburn has followed the 5-minute rule in handling important measures, with only one or two exceptions.

The Republicans are less aggressive in the House than in the Senate. House members have apparently not yet recovered from the shock of the November elections and shy away whenever any issue of liberalism is brought up. Unless they can get over their gun-shyness before the labor bill comes in, it is seen probable that they will coast along, making as much friction as they can without getting into an exchange of taunts with the Democrats, and leave it to the Senate group to get the kind of a bill they want.

Lockhart Sells Properties In Agua Dulce Field

HOUSTON.—David Ring, independent oil operator, and Stanley Gill, petroleum engineer, both of Houston, have purchased oil and gas properties of L. M. Lockhart in Agua Dulce field, Nueces County, for a consideration of $25,250,000.

Cash payment is believed to be $5,750,000 with the remainder to come from future production of the properties. More than 13,000 acres, including 9,000 proven acres, and a cycling plant are included in the deal. There are 81 oil and gas wells and 2,000 bbl. daily oil production involved.

The cycling plant has a rated capacity of 60,000 M.c.f. of gas daily and is producing around 20,000 gal. of products. The field is located about 30 miles west of Corpus Christi.

Ring and Gill will operate as Gillring Oil Co. with offices in the Gulf Building, Houston. The new company assumed active charge of the properties February 1. The new operators have been in with Lockhart as "observers" since last September.

It is reported that Lockhart will continue to operate in Southwest Texas as L. M. Lockhart and as Lockhart Oil Co. of Texas. He will continue to maintain an office in San Antonio with a representative at the Agua Dulce field.

Index Ready Soon

The complete editorial index of The Oil and Gas Journal for 1948 is now in preparation and will soon be ready. The complete index, enlarged and improved and with more cross-references, bound separately, will be sent without charge to all subscribers requesting a copy. Address requests to Circulation Department, P.O. Box 1260, Tulsa.

Exploration Rights Approved in Alberta

CALGARY, Alta.—The Alberta Government has approved nine exploration reservations on Crown oil and gas rights totaling 534,200 acres. All reservations are located on the south plains of the province, a region which in recent weeks has had a land play paralleling that in the northern part of Alberta.

Husky Oil & Refining, Ltd., Canadian subsidiary of Wyoming's Husky Refining Co., has joined the enlarging land play southeast of Calgary. The company will explore two new Crown reservations totaling 126,560 acres, with northwest corner about 35 miles southeast of Calgary at the village of Mossleigh. The block swings south from Mossleigh to a point 7 miles southeast of Vulcan. East boundary of the block flanks the Lake McGregor reservoir.

Subsidiaries of Amerada Petroleum Corp. have been granted four more Crown exploration reservations covering 276,600 acres, boosting the firm's block in the southeast Hardisty area to 372,272 acres. A 95,672-acre reservation in the region was announced last week. The Amerada block is located about 145 miles northeast of Calgary, with south boundary 15 miles north of Coronation and extending east to a point 11 miles north of Monitor. Swinging north, the block crossed the railway line between Hardisty and Cairns, and extends to the south border of the Wainwright military reservation.

Sparky Oils, Ltd., Winnipeg independent with production and acreage interests at Lloydminster, has taken up two Crown reservations totaling 118,720 acres in the Cereal-Oyen area 140 miles east and a little north of Calgary. The block ties on the south of a reserve acquired a few weeks ago by Pacific Western Oil Corp.

C. Vernon Myers of Calgary has been granted a Crown exploration reservation covering 12,320 acres straddling the railway at Rose Lynn, about 18 miles southeast of Hanna, scene of a recent oil discovery. The block is about 95 miles east and north of Calgary.

Field Conference Planned

The third annual field conference on Silurian formations and reef structures of Northern Indiana, sponsored by the department of geology, Indiana University, and division of geology, Indiana Department of Conservation, will be held May 13-15.

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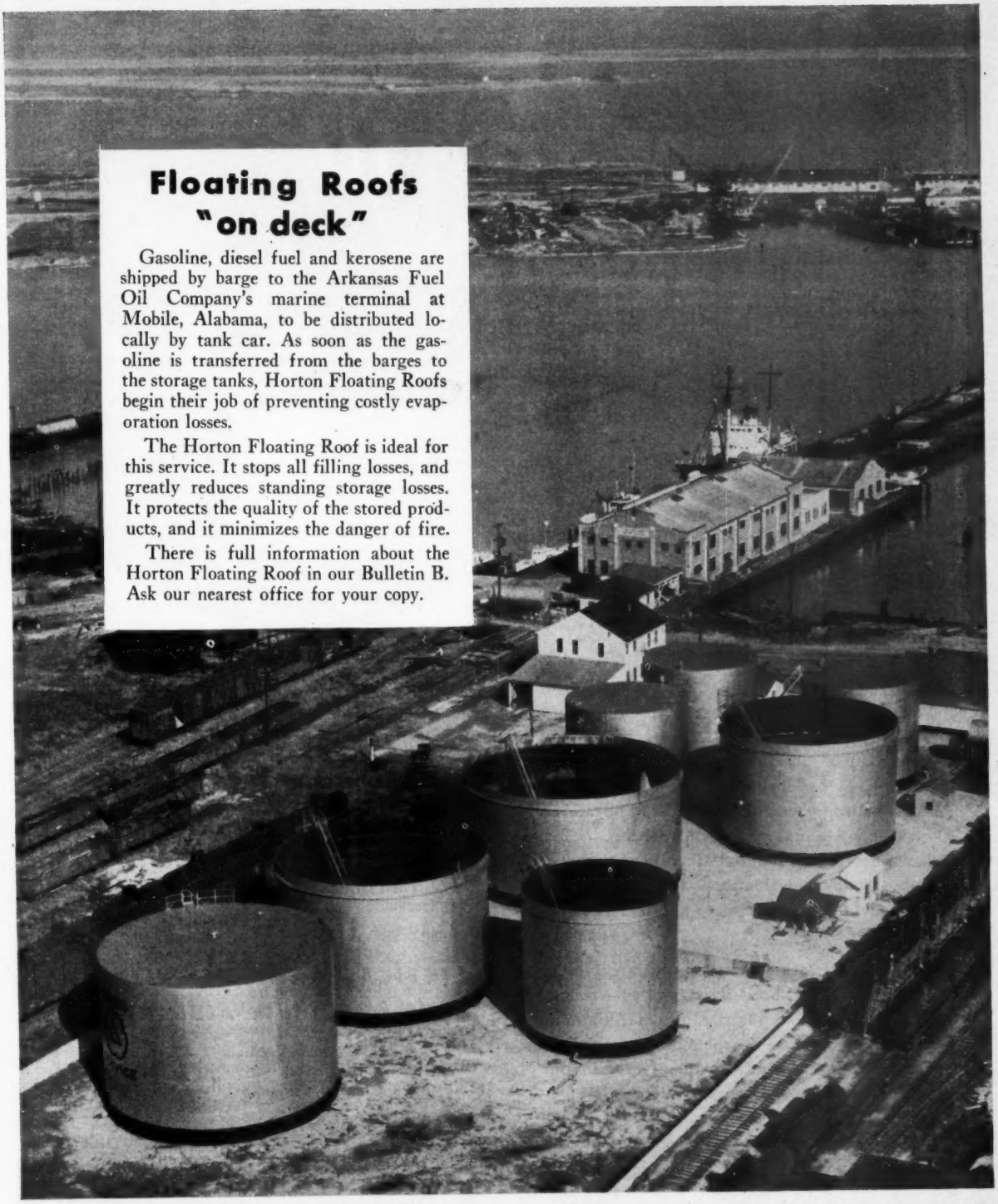

Floating Roofs "on deck"

Gasoline, diesel fuel and kerosene are shipped by barge to the Arkansas Fuel Oil Company's marine terminal at Mobile, Alabama, to be distributed locally by tank car. As soon as the gasoline is transferred from the barges to the storage tanks, Horton Floating Roofs begin their job of preventing costly evaporation losses.

The Horton Floating Roof is ideal for this service. It stops all filling losses, and greatly reduces standing storage losses. It protects the quality of the stored products, and it minimizes the danger of fire.

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Detroit, 26.....1514 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston, 2.....2119 National Standard Bldg.
Los Angeles, 14.....1423 Wm. Fox Bldg.
New York, 6.....3347-165 Broadway Bldg.
Philadelphia, 3.....1615-1700 Walnut Street Bldg.
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Seattle, 1.....1325 Stuart Bldg.
Tulsa, 3.....1606 Hunt Bldg.

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Typical hardness and alkalinity analyses given at right serve to show what you may expect from properly applied Nalco Sodium Aluminate treatment. For details on the Complete Nalco System of Water Treatment for your plant, call your Nalco Representative — or write Nalco today.

Nalco chemicals are available in liquid, granular or powder forms, and in convenient 1-lb. ball briquets.

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1.3 gpg.	2.5 gpg.	4.2 gpg.

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0.5 gpg.	2.0 gpg.	3.5 gpg.

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ECA Reveals Prices Paid for Crude; Recovers Overcharges

WASHINGTON.—Marshall plan countries paid prices ranging from $1.91 to $3.34 per barrel, f.o.b port of loading, for crude purchased under the European Recovery Program last year, and up to November 22 the Economic Cooperation Administration had paid out $21,990,590 for 9,744,073 bbl. involved in 97 transactions, according to an abstract prepared by the ECA last week.

The low price was paid to Esso Export Corp. for 35° A.P.I. gravity Arabian crude shipped from Ras Tanura to Fawley, England. The top price went to Dale W. Moore Oil Co. for something under 30,000 bbl. of 38.5° gravity East White Point type exported from Corpus Christi to Le Havre, France.

With the exception of 43,325 bbl. of 40° gravity Nebo type crude sold by Placid Oil Co. to France at $3.14-$6 per barrel, all of the exports from the United States were made by the Moore company at $3.24 per barrel for Benavides type, $3.33 and $3.34 for East White Point, and $3.16 for 23.9° gravity McFadden heavy.

Caribbean oil, furnished by Esso Export, was sold at $1.98 for Lagunillas type, $2.59 for Oficina, and $2.54 for Tia Juana from Venezuela, and $3.40 for Tia Juana from Aruba.

Gulf Oil Corp. sold Kuwaitian oil to France at $2.15 per barrel, and Esso Export sold the same type at the same price for corresponding grade and $2.01 for crude of unspecified degree. Esso also furnished Iraqi oil at Tripoli for $2.93 per barrel and Socony-Vacuum Oil Co. sold it at $2.92.

Arabian Crude Reduced

The price for Arabian oil at Ras Tanura in general ran between $2.01 and $2.08 per barrel for the greater part of the period, after having been $2.20 and $2.22 until price reductions were made the latter part of June.

A footnote to the abstract explained that ECA follows the practice of paying promptly for programed commodities, but has a standing agreement with each country giving it the right to demand a full return for any item the price of which is found upon postaudit to have exceeded the prevailing price at the time of purchase. None of the items on the schedule have as yet been finally postaudited, it was said, but there was no indication that the $2.20-$2.22 price for Arabian oil was not the going price at the time it was paid.

ECA has collected approximately $120,000 from the French Government, representing premiums paid for crude oil purchased last spring under the European Recovery Program, and indicated it would seek reimbursements from other Marshall plan countries if audits of oil purchases now being made show that they, too, paid premiums.

The agency explained that, in order to speed procurement of vitally needed supplies, it has followed the policy of making prompt payments to participating countries for commodity purchases, with the understanding that the payments are subject to subsequent audit.

Under the act providing the ECA's appropriation, it is not permitted to finance purchases of commodities in bulk at prices higher than the market price prevailing in this country at the time of purchase, adjusted for differences in cost of transportation to destination, quality, and terms of payment.

Revenue Decision Affects Donative Assignments

WASHINGTON.—The Bureau of Internal Revenue has issued a new decision on the tax treatment of donative assignments of short-lived in-oil payment rights.

The decision was issued in response to a request for advice with respect to the treatment of such assignments carved out of any type of depletable economic interest in oil and gas in place, including a larger in-oil payment right.

The bureau held that such donative assignments are assignments of future income, but the ruling will be applied only to such assignments made after January 24.

Congress May Extend Trade Agreements Act

WASHINGTON. — Legislation extending Public Law 395 until next September 30 was sent to the White House for approval last week, and this week Congress began consideration of a measure to extend the Reciprocal Trade Agreements Act until June 12, 1951, and repeal the amendments written into the law last year.

Continuance of the act under which the voluntary agreements made by the oil and steel industry were authorized was accomplished without difficulty since, having been originated by the Republican-controlled Eightieth Congress, it was a bipartisan measure.

Although there is little doubt of the ability of the present Democratic majority to put through the legislation on trade agreements, considerable opposition has been expressed to the elimination of the amendment adopted last year and while the House probably will pass the bill with only a couple of days of discussion, more may be required when it gets on the Senate floor.

Next Week

$230,000,000 worth of plants.—That was the direct governmental expenditure in 29 wartime aviation-gasoline facilities. A feature article will detail where each plant was built, what it consisted of, who operated it. It will also give for each plant the original actual cost, depreciated value, to whom it was sold, and the sale price (a few plancor properties are still up for sale). The data will comprise the most up-to-date factual report on this subject.

Well workovers and equipment replacements.—From Gulf Oil comes a discussion of the economic factors and practical considerations involved in making decisions on these operations.

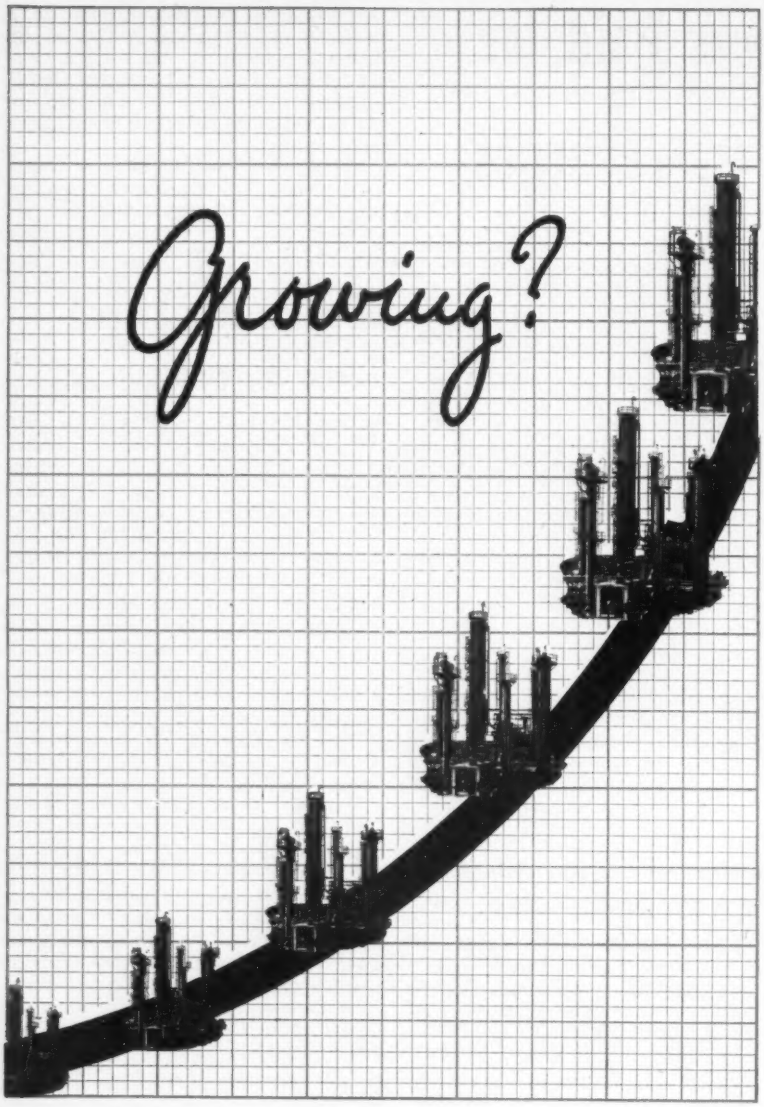
Rough route.—One of the toughest construction problems in recent pipe-line construction was that of the 24-in. loop line of Tennessee Gas Transmission in West Virginia. The Journal's pipe-line editor makes a report on ditching, road and river crossings, bending problems involved.

Sulfur from natural gas.—Processing procedures, equipment, and cost factors are detailed together with five different flow charts, for production of elemental sulfur from hydrogen-sulfide-bearing natural gas.

Pump data.—Application of use of vertical turbine-type pumps in flood hazard locations.

Compiled formulas.—Two-page engineering summary for problem solutions in structural geology.

Reservoir engineering.—The first of six summarization statements by Dr. Morris Muskat of Gulf Research, on problems in this field. These six summary articles will highlight Dr. Muskat's recent 3-day lecture series presented at special petroleum-engineering sessions at University of Texas.



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UOP

Frontier Throughput Up Nine Times Since 1940

By M. H. Robineau
Pres., Frontier Refining Company

In 1940 we founded the Frontier Refining Company as owners and operators of a small skimming plant on the outskirts of Cheyenne, Wyo. In our first year of operation, the daily crude oil throughput averaged 1,275 barrels.

M. H. Robineau

Today, after a consistent program of expansion and improvement carried out with the cooperation of Universal Oil Products Co., our daily throughput is approximately 11,000 barrels—nearly nine times that of our first year.

Total production of gasoline in 1940 was 7,576,000 gallons; in the year ended May 31, 1948, it was 56,500,000 gallons, and in addition, we produced other and readily marketable products.

Succeeds Marketing Company

Frontier Refining Co is the successor to Western Nebraska Oil Co. established in 1925 to market gasoline and other petroleum products to consumers in the small towns and on farms and ranches in the western part of the State. As the marketing business grew, the acquisition of an assured source of product supply became more and more desirable. Frontier became such a source.

Having placed our refinery in operation, our next objective was to increase the efficiency and economy of its operations and to improve the quality of its products. One of our first moves in that direction was to call in Universal Oil Products Co.

The result was installation of a UOP thermal cracking unit with a design capacity of 750 barrels per day which was placed in operation in the summer of 1941 and which has been in successful operation since that time.

War Record

Frontier has a war record of which we are all proud. Immediately after Pearl Harbor, we again called in Universal and worked out plans which were subsequently approved by the Petroleum Administration for War. These plans called for the installation of a separate aviation gasoline refinery employing the most effective processes and techniques to convert products derived from Rocky Mountain crude into components of 100-octane gasoline.

All elements of this refinery were designed and engineered by UOP. Prominent among them was a fluid catalytic

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cracker of unique design. Many of the costly parts which had been incorporated in the earlier fluid units were eliminated to effect important savings in construction costs. Other processes in the aviation gasoline plant were UOP hydrogen fluoride alkylation, UOP butane isomerization, gas concentration and UOP thermal reforming.

This plant, which was built as speedily as the necessary materials could be obtained, was located on a site adjacent to the existing refinery, so that gases produced by the thermal cracking unit and other facilities in the Frontier plant could be readily transported to the new units as raw materials for the production of 100-octane gasoline components.

The new facilities, which were owned by the Defense Plant Corporation and operated by the Frontier organization, went into service on Feb. 22, 1944. Between that date and Aug. 15, 1945, the plant delivered more than 30,000,000 gallons of high octane aviation gasoline.

Government Plant Purchased

At the close of the war, we assumed operation of the new government plant on a rental basis and used it to manufacture high quality commercial gasoline until the spring of 1947 when we purchased the facilities outright.

A program of converting and improving the combined refineries was undertaken at once and is still in progress.

Among the many projects either completed or under construction at this time, are a catalytic polymerization unit, a new vacuum unit, a new thermal cracker, road oil and asphalt blending facilities, new boiler plants and loading docks, a steam line connecting the two plants, and a Unisol treating unit. Storage facilities have been expanded in several instances.

Valuable assistance has been received from Universal Oil Products Co., both in negotiating the purchase of the government plant and in its conversion to peacetime operation, as well as in the designing and engineering of the new facilities.

Drilling and Marketing

In addition to our program of plant improvement and expansion, we have, for the past several years, pursued an aggressive campaign of exploration and drilling. This already has achieved considerable success and it is hoped that it will eventually make Frontier entirely self-sufficient as to crude supply.

Our sales organization is currently marketing "Rarin'-to-Go" brand gasoline and certain other products in Wyoming, western Nebraska, South Dakota, Colorado, Utah and Idaho. While a few bulk plants and retail outlets are company-owned, the independent jobber is the backbone of the Frontier marketing structure. Road oils and asphalts are marketed in Nebraska, South Dakota, Wyoming, Colorado, Minnesota and Wisconsin.

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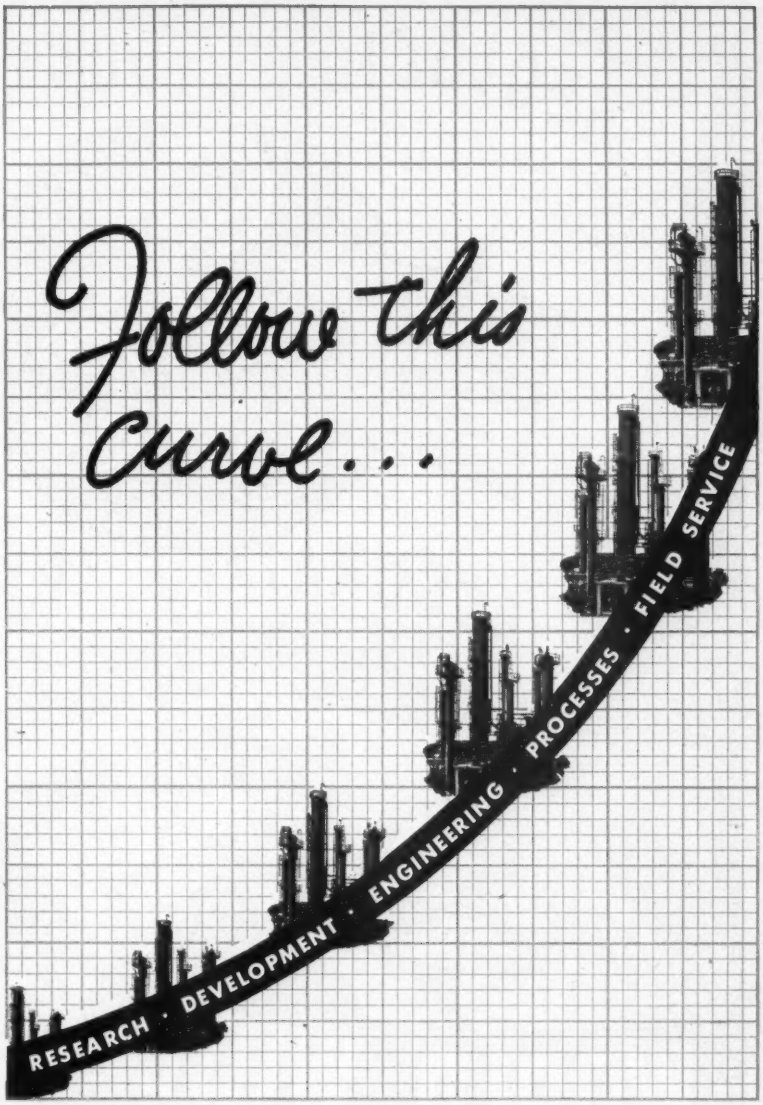

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- ★ Seismograph Service Corporation of Venezuela
- ★ American Exploration Company (U. S. A.) Marine

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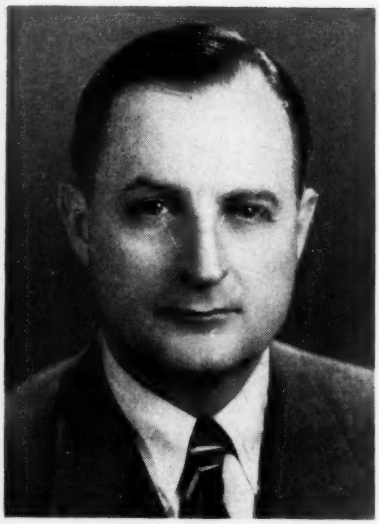
PERSONALS



Yost Named Manager of Stanolind's Production

F R. YOST, operating superintendent, has been named manager of producing department, Stanolind Oil & Gas Co., Tulsa, a newly created post, and will assume responsibility for the company's producing operations, which are located in 11 states, and which average approximately 200,000 bbl. per day.

Yost started in the oil business as a roughneck with Yount-Lee Oil Co. in 1934. The following year, when most of Yount-Lee's properties were purchased by Stanolind, Yost went with Stanolind as roughneck in High Island field in Texas. Later he worked as driller, tool pusher, and field superintendent. In 1934 he was named head of industrial relations for the Texas-Louisiana Gulf Coast division in Houston. Later he became district production superintendent for Kansas.

In 1945 Yost was made drilling superintendent in the producing department, and since January 1, 1947, he has been operating superintendent.

Yost attended the University of Texas, and recently took the advanced management course of the Harvard Graduate School of Business Administration.

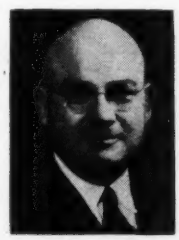
Frank Lindeman, Jr., Tulsa, has been made operating superintendent of the producing department, Stanolind Oil & Gas Co., succeeding **F. R. Yost,** who was named manager of the department. Lindeman has been assistant division production superintendent for the Texas-Louisiana Gulf Coast division at Houston, in charge of offshore operations in the Gulf of Mexico since August 1948. He is a graduate of Colorado School of Mines, and joined Stanolind in 1933.

John W. House, West Texas-New Mexico division superintendent of Humble Oil & Refining Co., has been reelected president of the Midland Petroleum Club.

John R. McNulty has resigned as division director of personnel with Ohio Oil Co., at Casper, Wyo., to become manager of industrial relations for Husky Refining Co., Cody, Wyo.

George Murray, Cattage, Tex., has been elected president of the East Texas Natural Gasoline Men's club. Other officers elected are: **John P. Tucker,** Longview, Tex., vice president; and **Don Nelson,** Overton, Tex., secretary.

Thomas E. Turner, geologist formerly with Magnolia Petroleum Co., has joined Equity Oil Co. and will be in charge of geological operations in the company's newly discovered Ashley Valley area in Uintah County, Utah.



WM. E. MURRAH

William E. (Cap) Murrah has resigned as secretary-treasurer of Creslenn Oil Co., Dallas, to become secretary of Transcontinental Gas Pipe Line Corp. Murrah has been connected with Transcontinental since its organization in 1946. He has been with Creslenn interests since 1945 and prior to that was with Cities Service Oil Co. and Phillips Petroleum Co. **L. J. Meyer,** senior engineer, Texas Railroad Commission, February 15 will become associated with Transcontinental in Houston. Meyer will handle reservoir-engineering work, calculate reserves, and long-range deliverability of gas into pipe lines.

W. T. (Tex) Westergard has joined Houch Drilling Co. in an executive position. Westergard was born in El Paso and attended University of California where he studied engineering. He worked for some time for Hancock Oil Co. in Long Beach, Calif. Prior to joining Houch he was for 14 years connected with E. H. Edwards Co., wire-rope manufacturers. For 8 years he was in Houston as branch manager and for the past 6 years in San Francisco as sales manager.

Evert W. Kilgren, chemical engineering group leader for Stanolind Oil & Gas Co., has been named project engineer in the manufacturing department, Tulsa general office. Other personnel changes include: **Arthur H. Denny,** named operating engineer in the Tulsa manufacturing department; **John M. Hillsman,** named chemical engineering group leader in the Tulsa manufacturing department; **Lloyd L. Christenson** and **Jack P. Barrett,** named technical group leaders at the Tulsa research laboratories.

R. C. FARLEY

J. S. LEONARD

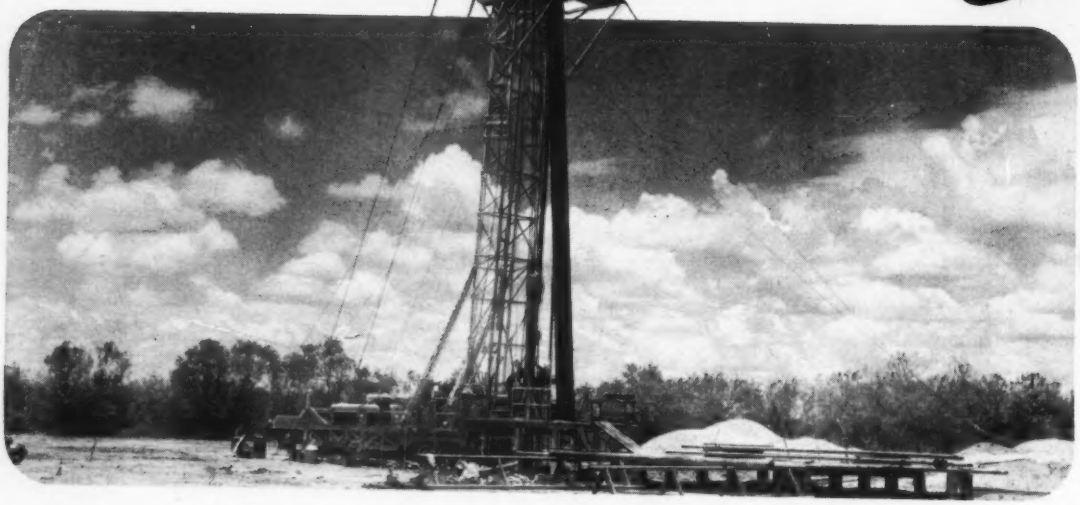
Ralph C. Farley, district superintendent in charge of offshore drilling operations in the Gulf of Mexico for Ohio Oil Co., has been appointed assistant to **Fred E. Smith,** general superintendent of production, and has assumed his new duties at the company's general offices in Findlay, Ohio. A native of Wichita, Kans., Farley began his career with Ohio in the pipe-line department at Del Rio, Tex., in 1926. He was appointed district foreman in charge of production in the Rodessa, Tex., field in 1939. **John S. Leonard,** drilling foreman at Reed City, Mich., has succeeded Farley as superintendent of offshore drilling operations in the gulf. Joining Ohio in 1930 after attending the Colorado School of Mines, Leonard served in Mexico as a geologist. Named district petroleum engineer at Hobbs in 1940 and at Bay City, Tex., in 1941, Leonard became superintendent of the Ross Ranch, Texas, field in 1945, and drilling foreman in 1947.

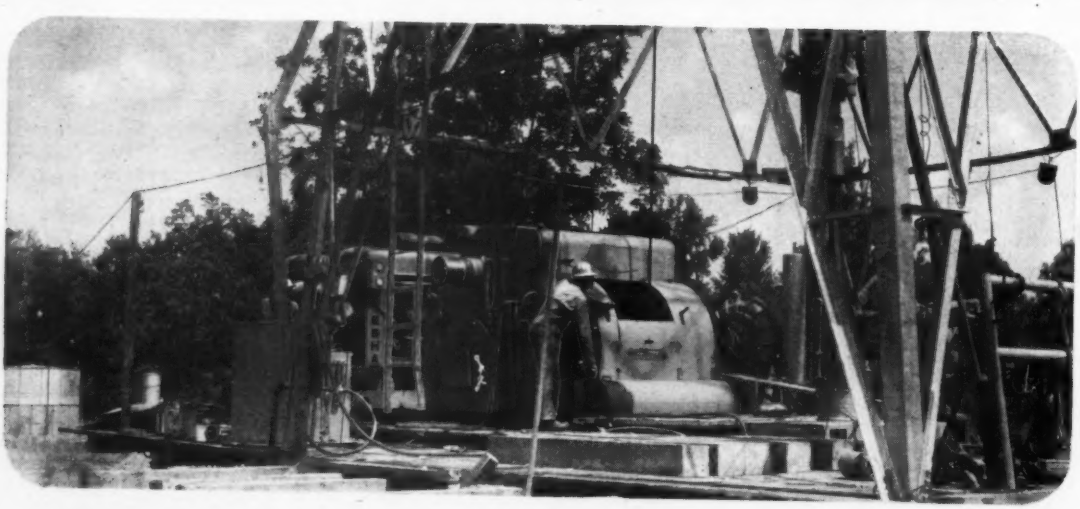
George H. Gaul, geologist for Sinclair-Wyoming Oil Co., in the Rocky Mountain region, has resigned to enter consulting geological work. He will be headquarted in Salt Lake City.

Earl B. Sloan, who has served 31 years in the producing division of Pure Oil Co., has been appointed manager of the gas department of the company. He will be succeeded as manager of the material control department by **William C. White,** of the Illinois producing division.

DEPENDABLE

Drilling





and Workover

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The most modern and completely portable of all rigs. Transported with engines, block, hook and lines in place—ready for operation in a few minutes. Ninety-foot mast is raised by hydraulic rams. Draw works has "Cardwell" Air Disc friction clutches in both ends of main drum, making it possible to double the line speed by moving a single lever. Sand line drum has "Cardwell" Air Disc friction clutch.

DOUBLE-ENGINE MODEL O FOR 8,000-FT. DRILLING AND 15,000-FT. WORKOVER

This sturdy deep-well rig can be transported on one truck without removing engines. Dual drives to main drum provide six forward speeds to draw works. Special three-speed chain transmission has high torque capacity. Model O is available with "Cardwell" Air Disc clutches throughout, or with manually controlled Twin Disc clutches. Sand line drum is optional with both models.

TWO SINGLE ENGINE RIGS — MODEL S FOR 4,500-FT. DRILLING AND 10,000-FT. WORKOVER—MODEL L FOR 3,500-FT. DRILLING AND 8,000-FT. WORKOVER

Low-cost moves, quick rig up and fast operation make these draw works real profit-makers. "Cardwell" Air Disc clutches in "Hi-Lo" drive make it possible to double the line speed instantly. Model S and Model L are available with either gear transmission or torque converter. Finger-tip air controls operate "Hi-Lo" drive, rotary drive, automatic cathead and rotary brake. Draw works can be transported on one truck with largest engine in place.

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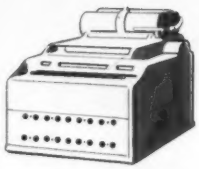

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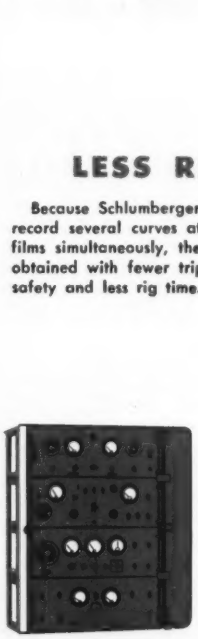

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HOUSTON, TEXAS

William R. Waggoner will continue in the gas department as gas superintendent. All three will be located in the Chicago, Ill., headquarters.

Joseph Saxon, Jr., Wyandotte, Mich., has joined the staff of the Pennsylvania Grade Crude Oil Association's secondary-recovery research laboratory at Bradford, Pa., as chemical engineer.

Dr. Warren K. Lewis, emeritus professor of chemical engineering at Massachusetts Institute of Technology, noted for his contributions to research particularly in the field of petroleum refining, has been selected to receive the 1949 gold medal of the American Institute of Chemists. Presentation of the medal will be made at the annual meeting of the institute in Chicago, May 6-7.

George A. Johnson, area manager for India, Pakistan, Burma, and Ceylon for Standard-Vacuum Oil Co., retired on February 1 after 37 years of service.

Tom W. Flewharty of Western Co., Midland, Tex., has been appointed secretary-treasurer of the Permian basin chapter of the American Petroleum Institute. He succeeds **Jay Boxell,** Midland, with Phillips Petroleum Co.

Guy E. Green is president of the newly organized Wy-Tex Oil Co. of San Antonio, capitalized at $450,000. Other officers of the firm are: **A. D. Larson,** secretary-treasurer; **J. Maclin Harrison,** assistant secretary-treasurer, and **John T. O'Neil,** chairman of the board.

Max Krueger will be head of the newly formed Rocky Mountain division of Union Oil Co.'s field department. With headquarters at Laramie, Wyo., the division will include Utah, Nevada, Arizona, Western New Mexico, Colorado, Wyoming, and Montana.

W. E. Cassidy, of The Texas Co., has been elected state chairman of the Louisiana oil-industry information committee. Other officers are: **W. S. Milton,** Shell Oil Co., Inc., vice chairman, and **P. V. Rome,** Esso Standard Oil Co., secretary.

M. D. Gjerde, Standard Oil Co. (Ind.), has succeeded **E. W. Upham,** Chrysler Corp., as chairman of the fuels and lubricants committee of the Society of Automotive Engineers, Inc. Upham had served as chairman of the committee and its predecessor, lubricants division of the standards committee, for 20 years.

H. S. M. Burns, Shell Oil Co., will direct a special committee of the National Petroleum Council to study the advisability of making a petroleum census next year covering the industry at the end of 1949.

C. W. DAWSON

C. W. Dawson, Standard Oil Co. of California, has been appointed chief engineer of the company's producing department, replacing the late H. B. Davis. Dawson has been with the company since June 1929 after graduating from Stanford University with an A.B. degree in mechanical engineering. He joined the company as an engineer in the maintenance and construction division at Kettleman Hills, Calif., and has held various engineering positions in the field since that time. **V. L. Taylor,** general manager of operations, producing department, San Francisco, has been named field superintendent in the Coalinga area producing department, and **R. W. Norton** has been appointed to fill Taylor's previous post. Taylor has been with California Standard since May 1935, starting as a petroleum engineer in the Southern California oil fields. Norton also joined the company in May 1935, and has served as district petroleum engineer and acting superintendent for the parent company and subsidiaries in Canada, the northern district, and the San Francisco office.

H. R. Bolton, division petroleum engineer at Tulsa for Ohio Oil Co., has been transferred to Marshall, Ill., as division petroleum engineer for the company's Terre Haute, Ind., division. **R. E. McMillen,** district petroleum engineer at Midland, Tex., will succeed Bolton at Tulsa. **D. V. Kitley,** petroleum engineer in the Midland district, replaces McMillen as district engineer.

Frank Millard, Schlumberger Well Surveying Corp., Ardmore, Okla., has been elected president of the newly formed Ardmore Petroleum club. Other officers are: **Bob Greider,** The California Co., vice president, and **Meryl Williams,** Seaboard Oil Co., secretary-treasurer.

C. C. Crawford, manager of the chemical products department, Phillips Petroleum Co., has been elected vice president and sales manager of Phillips Chemical Co., a wholly owned subsidiary. A new division of Phillips Chemical has been formed to be known as Philblack sales division for the sale of Philblack furnace carbon blacks and fertilizers, and the personnel formerly handling sale of Philblacks for Phillips Petroleum has been transferred to the new division.

J. A. LaFortune, executive vice president of Warren Petroleum Corp., Tulsa, was the recipient of an honorary degree of doctor of laws by the University of Notre Dame, South Bend, Ind.

G. R. Preston, Bartlesville, Okla., assistant treasurer, Cities Service Oil Co., has been named manager of the company's economics department, and will continue to head the program for acquiring producing properties. He joined Cities Service in March 1925, 5 years later was appointed budget manager, and in 1940 was elected assistant treasurer.

W. D. Frazell, with Union Producing Co. for 13 years, has joined Ray & Wolf, independent operators at Shreveport, as chief geologist.

B. W. Letcher, vice president, Standard Oil Co. of California, has been elected to the board of directors of the company. He has been with Standard since 1911, when he went to work as a clerk in the manufacturing department. He later became chief clerk in the general office, then assistant general auditor, and in 1926 was made general auditor. Letcher was elected secretary and controller in 1940 and a vice president in 1944.

C. L. Clark, Socony-Vacuum Oil Co., Inc., field operations manager in Egypt, plans to return to Egypt from New York early this month.

Andrew Gilmour, Amerada Petroleum Corp., Tulsa, vice president of the Society of Exploration Geophysicists, has been endorsed by the Geophysical Society of Tulsa to be elected president of the society. Gilmour served as secretary-treasurer of the national society in 1940-41.

Frank D. Potter, chief engineer for Hinderliter Tool Co. division of H. K. Porter Co., Inc., Tulsa, has joined Kuwait Oil Co., Ltd., as engineering assistant to the drilling superintendent, and will take up his new duties shortly at Kuwait, on the Persian Gulf. Potter was a junior petroleum engineer for The Texas Co. prior to military service. He was made Okla-

PERSONALS

homa district petroleum engineer for Texaco in 1947 and served in that capacity until he joined Hinderliter in 1948.

Glenn Nell, superintendent for Socony-Vacuum of Venezuela, has been visiting in the Texas Gulf Coast area. **Burch Spears,** formerly with the company, has returned to the United States.

Walter Strange, Mount Pleasant, Mich., recent graduate of Wesleyan College, Middletown, Conn., has been appointed geologist for The Texas Co., headquartered in Mount Pleasant.

S. W. Hardison, Casper, Wyo., general manager of production operations for General Petroleum Corp., has retired. He had served in that position since 1943, after serving in various capacities since he joined the company as a roustabout in 1916, at Ventura, Calif.

E. DeGolyer and **Lewis MacNaughton,** Dallas geologists, were recently awarded honorary memberships in the Dallas chapter of Nomads, for distinguished service in a geological capacity.

George Y. McCoy, Dallas, formerly with Republic National Bank of Dallas, has opened offices in the Empire Bank Building there as consultant in petroleum engineering and geology. He is a member of American Association of Petroleum Geologists, and the A.I.M.E.

A. A. Nance, assistant personnel supervisor for Humble Oil & Refining Co., has resigned to accept a position as foreign employe relations advisor for Standard Oil Co. (N.J.), headquartered in New York.

E. B. McGehee, Jackson, Miss., independent oil operator, has been named chairman of the conservation committee of the Mississippi-Alabama division of the Mid-Continent Oil and Gas Association.

James K. Ellis, vice president in charge of production for Sunray Oil Corp., Tulsa, has been named a member of the company's board of directors. He has been associated with Sunray since 1946 when he became an officer of the company at the time Transwestern Oil Co. was merged with Sunray.

Earl B. Noble has been made chief exploration geologist, responsible for all exploration work outside of Union Oil Co.'s existing districts, and including Alaska and foreign exploration.

Jed B. Maebius, former geologist for Gulf Refining Co. in Michigan, was recently elected president of the Wyoming Geological Association.

Harrison F. Johnson, Independence, Kans., for 10 years vice president of Union Gas System, Inc., has been elevated to president of the company, succeeding the late Paul R. Johnson. H. F. Johnson is a nephew of the company's late president. He is a graduate of the school of engineering, University of Kansas, and spent 3 years with the engineering firm of Ford, Bacon & Davis, on construction of major pipe lines in the Southwest. From 1930 to 1936 he was employed by Canadian River Gas Co., Amarillo, Tex., at the company's pipe-line extension from Amarillo to Denver. He joined Union Gas in 1936.

SHIFTS—

F. H. Walsh, engineer, Humble Oil & Refining Co., Monroe City to Houston, Tex.; **J. W. Rhea,** engineer, Humble Oil & Refining Co., Westwego, La., to Houston, Tex.; **Walter R. Pavrlchek,** engineer, Sinclair Refining Co., East Chicago to Hammond, Ind.; **Edwin Ivor Thompson,** geologist, Phillips Petroleum Co., Bartlesville to Dewey, Okla.; **Robert L. Rankin,** engineer, Shell Oil Co., Inc., Oklahoma City to Wichita Falls, Tex.

E. E. McClusky, foreman, Sun Pipe Line Co., Stowell to Stonewall, Tex.; **J. W. Chervenka,** engineer, The Texas Co., Sundown to San Angelo, Tex.; **John T. Gray,** engineer, Wichita Falls, Tex., to Ponca City, Okla.; **Richard H. Denman,** engineer, Stanolind Oil & Gas Co., Lake Charles, La., to Corpus Christi, Tex.; **Walter A. Smith,** superintendent, Failing Exploration & Drilling Co., Citronelle, Ala., to Stephenville, Tex.; **Pete Cawthon, Jr.,** engineer, Phillips Petroleum Co., Eureka, Kans., to Odessa, Tex.

Darl D. Gillespie, engineer, Stanolind Oil & Gas Co., Ulysses, Kans., to Oklahoma City, Okla.; **J. R. Gilliland,** foreman, General Geophysical Co., Shoshoni, Wyo., to Oshkosh, Neb.; **V. L. Smith,** engineer, Sunray Oil Corp., Allen to Wewoka, Okla.; **E. J. Baker,** foreman, Phillips Petroleum Co., Edmond to Oklahoma City; **Will F. Earl,** geologist, Ohio Oil Co., Enid to Sayre, Okla.; **Ellis Hammett,** engineer, Sinclair Prairie Oil Co., Lindsay to Seminole, Okla.

Thomas M. Miller, Jr., engineer, Stanolind Oil & Gas Co., Oklahoma City to Wewoka, Okla.; **J. R. Ramirez,** engineer, Standard Oil Co. (Ind.), Atherton to Santa Ana, Calif.; **Ervin L. Turner,** engineer, Stanolind Oil & Gas Co., Floydada, Tex., to Biloxi, Miss.; **H. W. Reineke, Jr.,** engineer, Humble Oil & Refining Co., Houston, Tex., to Westwego, La.; **R. M. Holland,** geologist, Sinclair Prairie Oil Co., Gainesville to Houston, Tex.; **Orval J. Shirley,** engineer, Shell Oil Co., Inc., Kilgore to Houston, Tex.

DEATHS

Edward Templeton Moore, 82, at one time president of the former Simms Oil Co., Dallas, died February 4 in Dallas. He was a former president of the Mid-Continent Oil and Gas Association of Texas, and a director of the American Petroleum Institute.

Lee Koen, 65, former owner of the W-K-M Oil Field Supply Co., Houston, died February 4 in Houston.

Robert G. Dyktor, engineering supervisor of Creole Petroleum Corp.'s sales department in Caracas, Venezuela, died January 23 in Puerto Cabello.

Lloyd L. Norwood, 46, sales manager for Southeast Texas, The Texas Co., died January 29 in Houston.

Michael Jasina, retired Bayway refinery construction division employe for Esso Standard Oil Co., Linden, N. J., died February 3 in Elizabeth, N. J.

David T. Solomonson, 40, assistant general credit manager for Standard Oil Co. of California, died February 3 in San Francisco.

J. Ernest Thompson, 63, partner in the firm of Thompson & Thompson, independent operators, died January 30 in Houston.

James W. Starks, 67, director of the Illinois State Department of Mines and Minerals, died February 3 in Springfield, Ill.

Ernest C. Cortelyou, Oklahoma City, assistant superintendent of production, Cities Service Oil Co., died January 20 in Oklahoma City.

Raymond J. Lowe, assistant purchasing agent for Pure Oil Co., Tulsa, died February 1 in Tulsa.

Floyd Cummings Dodson, 53, geologist and pioneer independent oil operator of San Angelo, Tex., died January 29 in San Angelo.

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To haul lots of oil, you pick a he-man truck that's made for the job. You pick a truck with a record of performance that shouts "TOUGH!" You pick an International Truck.

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3. Real heavy-duty truck engineering!

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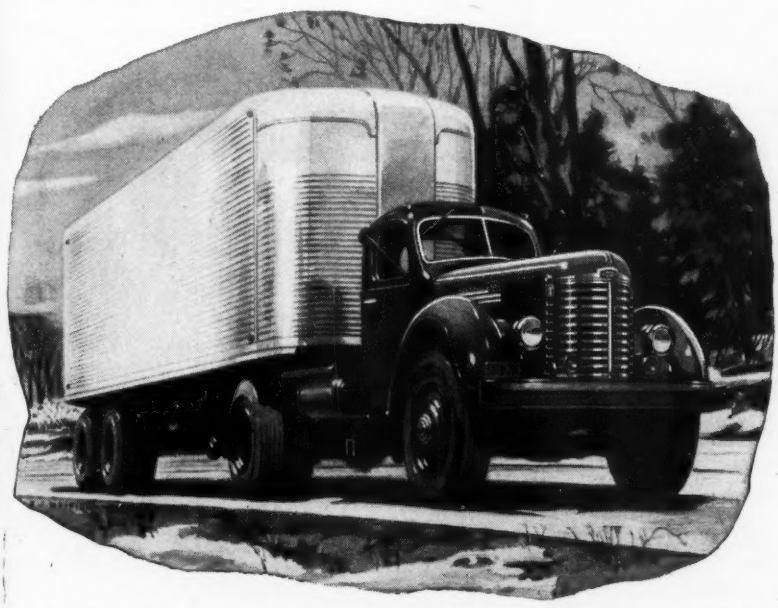

4. Real heavy-duty truck stamina!

Housing is a big job where you measure truck toughness by years of getting the work out and keeping the costs down on all hauling operations.

You can count on years of service from International heavy-duty trucks. The nation's largest exclusive truck service organization is set up to keep Internationals operating at peak efficiency, over the long haul.

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For 17 straight years, International heavy-duty trucks have been America's first choice for heavy-duty work. Registration figures prove it. In trucks having gross weight ratings over 16,000 pounds, Internationals are so far ahead of the field that the heavyweight crown carries a Triple Diamond emblem.

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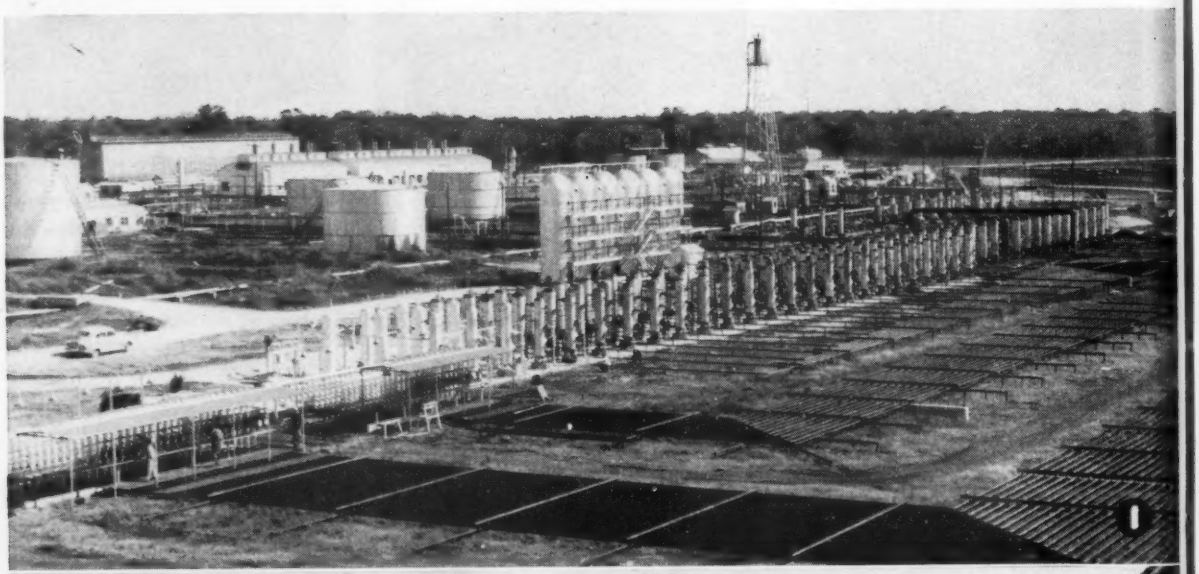
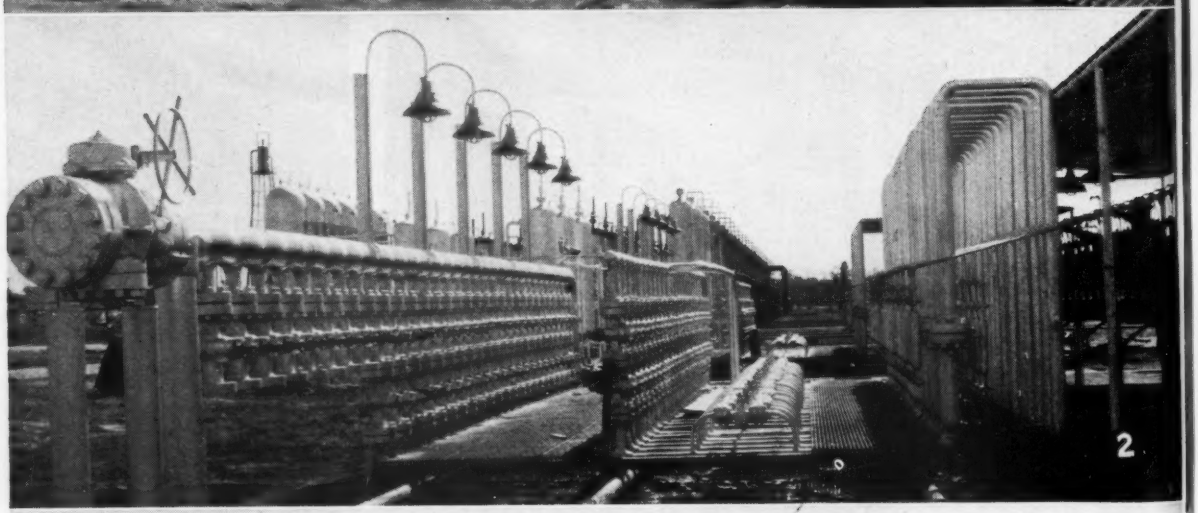
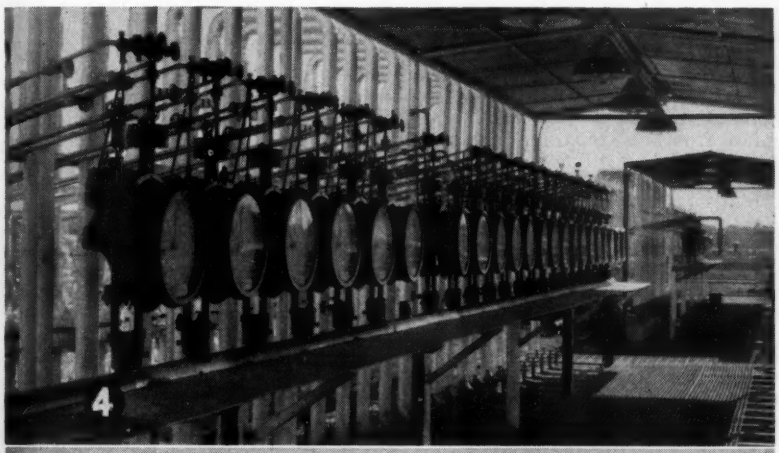
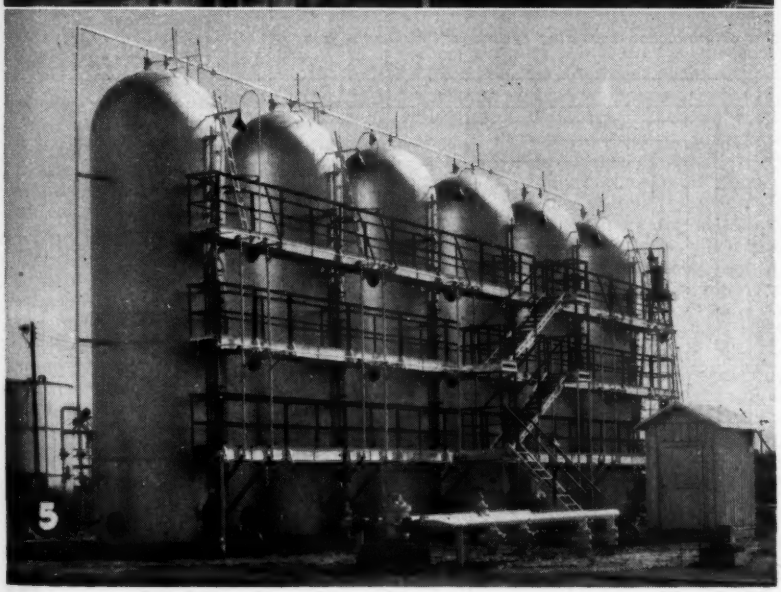




by Leigh S. McCaslin, Jr.

Stations installed in Gulf Coast Fields





IN a $1,900,000* program, operators in Old Ocean field of Brazoria and Matagorda counties, Texas Gulf Coast, with J. S. Abercrombie Co. as unit operator, have installed two of the largest separation stations in the world. Together, the two central separation stations in the field are handling daily 17,500 bbl. of oil and distillate and 350 M.c.f. of gas from 150 wells.

The separation stations are only part of a $3,000,000 expenditure being made at Old Ocean for more efficient operation of surface facilities under the recently adopted unit plan. (Old Ocean is the largest voluntarily unitized oil and gas field in the United States.) This program includes revisions and additions to the flow-line gathering system and absorption plant, and installation of crude-oil and distillate stabilization facilities. The stabilization facilities are expected to recover approximately 195,000 bbl. per year of products which were previously lost to the atmosphere. A total of 300 miles of pipe has been used in the flow-line gathering system.

Old Ocean Oil Co. and J. S. Abercrombie Co. are joint owners with Magnolia Petroleum Co. of approximately 85 per cent of the field's wells. These operators had two central separation stations in use before the field was unitized. However, in the current program these have been completely rebuilt and all wells in the field have been tied into these two points.

The revisions were made to obtain the best oil and gas measurement, secure adequate safety of operation, increase operating efficiency, and eliminate evaporation losses amount-

*This cost figure includes revisions to the field gathering system.

1—In foreground is the B.R.L.D. station, larger of two such stations serving Old Ocean field. Seen are the flow lines from 95 oil and gas-distillate wells served by the station. Behind separators are six 300-bbl. test tanks, and in background is seen part of the 350,000-M.c.f.-per-day absorption plant operated by J. S. Abercrombie Co.

2—In foreground are the headers which handle the 51 gas-distillate wells entering the B.R.L.D. station. Double block and bleeder-valve arrangement was used completely to eliminate contamination and to insure accurate testing. The well streams are measured individually with orifice meters located at the headers. The combined well streams then flow into large separators located at the absorption plant where the condensate is removed from the gas through three-stage operation before stabilization. In background are the three rows of separators for the 44 wells entering this station

3—Workmen are putting finishing touches on thermostatically controlled jacket heaters for the B.R.L.D. station flow lines. These heaters are designed to maintain uniform separation temperatures and to prevent formation of hydrates in the oil meters

4—This battery of meters measures gas-distillate production. After measurement, the gas distillate flows into gas headers coming from the oil-well separators, and the combined streams then go to the common separators located ahead of the plant

5—These 300-bbl. vertical tanks are used for individual well tests to calibrate the positive-displacement meters used to measure oil production, and for special gas-oil-ratio tests. Tanks are operated at 50-80 psi. to eliminate vapor losses. Small-diameter tanks were purposely selected to insure accurate gaging

These three 20,000-bbl. storage tanks at the B.R.L.D. station do the same job that formerly required 138 stock tanks and 48 gun barrels. These floating-roof tanks plus other features of Abercrombie's $3,000,000 program will save an estimated 195,000 bbl. of liquid hydrocarbons formerly lost to the atmosphere

ing to several hundred thousand dollars annually. Under the new system, gas-distillate production goes directly to common separators ahead of the Old Ocean absorption plant. Each oil well is produced through individual multistage separators, with the gas going to the plant in three pressure systems for processing. Both oil and distillate go to the plant under pressure for stabilization.

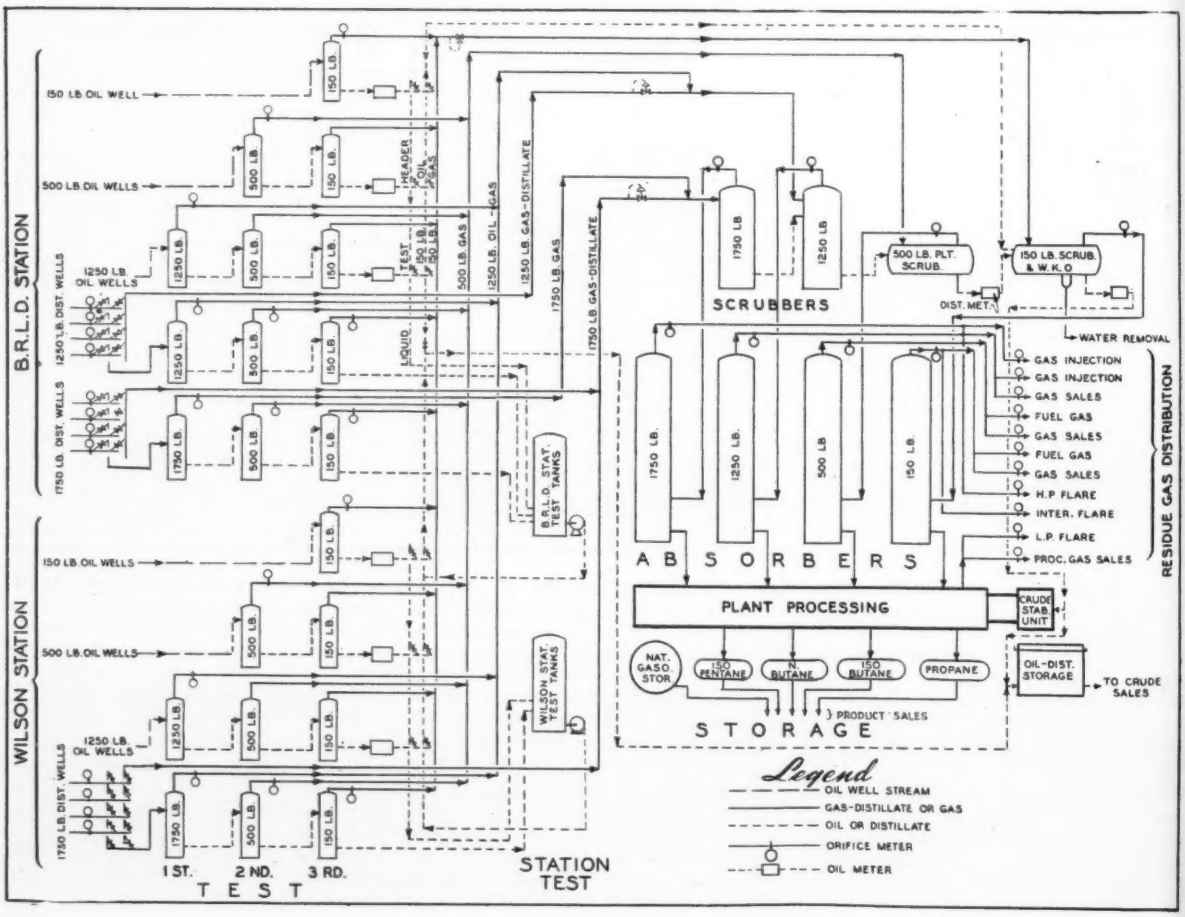
Large Station Serves 95 Wells

The largest of the two separation stations—the B.R.L.D. Station—serves 51 gas-distillate wells and 44 oil wells, a total of 95. It is located adjacent to the absorption plant. The smaller Wilson station is located in the east end of the field approximately 3 miles from the separation plant. It serves 26 gas-distillate wells and 29 oil wells, a total of 55.

Two pressure systems—1,750 and 1,250 psi.—have been installed to handle the production of the 77 gas-distillate wells. Individual gas-meter runs for each well are provided at the stations for daily measurement. Ahead of these runs are thermostatically controlled steam jacket heaters on the flow lines to prevent hydrate formation. After measurement, the gas-distillate stream flows into gas headers and directly to the separators ahead of the plant.

Three systems are being used to handle the production from the field's 73 oil wells. These provide three-stage, two-stage, and single-stage separation with each well having its own separators. The three-stage system consists of a 1,250 psi. primary separator, 500 psi. secondary, and 150 psi. tertiary. The two-stage system consists of a 500 psi. primary and 150 psi. secondary separator. In the single-stage system, the oil goes through a 150 psi. primary separator only. All oil from the two stations flows into the plant at 150 psi. where

Flow diagram of production-measuring system in Old Ocean field



SALIENT FACTS ON OLD OCEAN FIELD

Largest voluntarily unitized oil and gas field in United States.

One of the first deep, high-pressure fields.

Second largest absorption and compressor plant in Gulf Coast area located in field.

Discovery date: November 8, 1934.

Unitization date: August 1, 1948.

Producing wells:

Oil	**74**
Gas	**76**
Total	**150**

Pay: Frio sands between 9,000 and 11,000 ft.

Current production: 17,500 bbl. oil and distillate and 350,000 M.c.f. of gas.

Old Ocean Unit Operators: J. S. Abercrombie Co., Old Ocean Oil Co., Magnolia Petroleum Co., Fidelity Oil & Royalty Co., Mound Co., Stanolind Oil & Gas Co., The Texas Co., Tide Water Associated Oil Co., and R. A. Welch.

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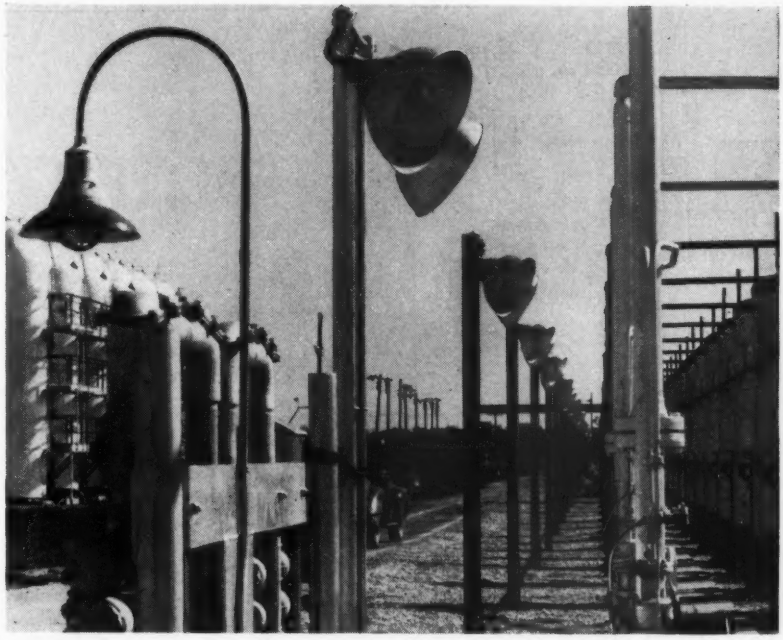

Here is graphic evidence of the care taken to insure adequate lighting at the separation stations. Circuit breakers are shown in left foreground

it combines with stage-separated distillate at the same pressure. After stabilization in the plant, the mixed stream flows into floating-roof tanks.

The production of each individual distillate well is determined as follows: A gas-liquid ratio taken monthly is applied to the daily measured gas volume. The total of the distillate production computed in this manner is then adjusted to the measured total distillate production out of the plant scrubbers.

The production of each well is determined as follows: The gas from each primary separator is measured daily and the total gas from secondary and tertiary separators is also measured. This total secondary gas is then distributed back to individual wells on the basis of each well's daily oil production. All oil production is measured with positive-displacement meters operating at 150 psi. This pressure level was chosen to insure uniform measurement for all production, and to minimize measurement error. The oil meters are calibrated monthly in pressure test tanks under the same operating conditions as their normal service. Thermostatically controlled jacket heaters are on the flow lines ahead of all primary separators. These heaters are designed to maintain uniform separation temperatures and to prevent the formation of hydrates in the positive-displacement meters.

Testing Procedure

For individual well tests, gas-distillate producers are put through a hookup similar to that used for oil wells producing with three-stage separation. Well operating on both the 1,750 and the 1,250 psi. systems undergo three-stage separation. Secondary separators operate at 500 psi. and tertiary at 150 psi. Gas from the primary, secondary, and tertiary separators is measured. The distillate flows from the 150 psi. separator into pressure test tanks.

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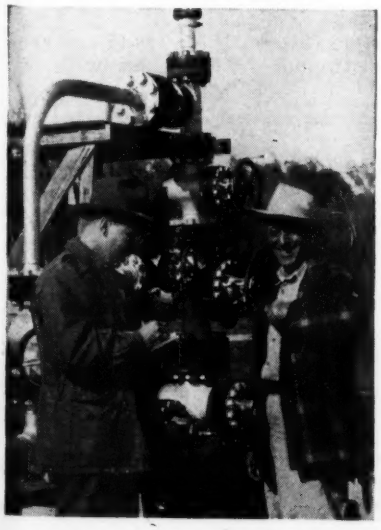
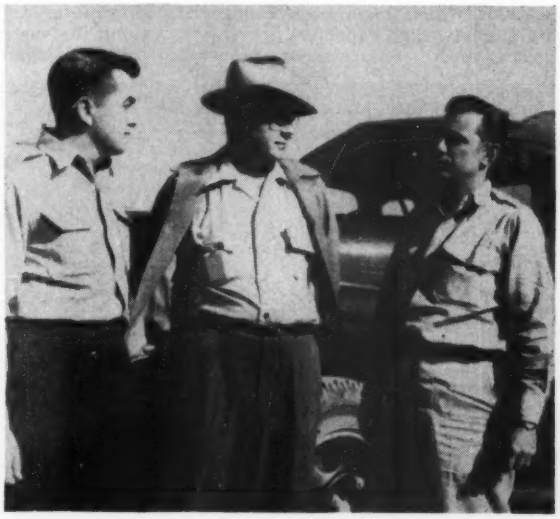
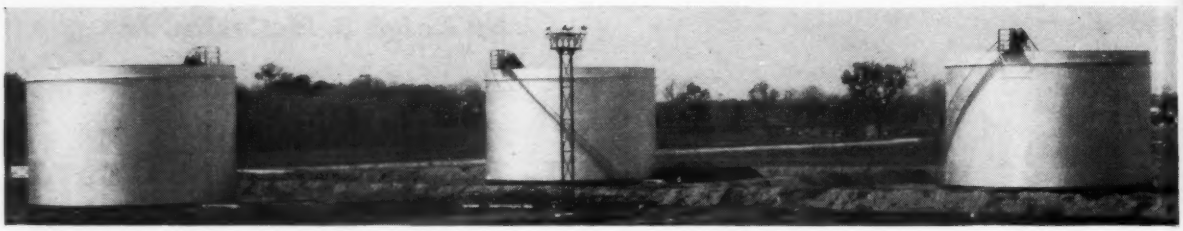


Left: The author (at left) and Paul Balon, chief well tester, at high-pressure input well, discussing piping layout and equipment features



Right: C. R. Burney, production superintendent; Harry W. Elliott, Jr., superintendent, and F. A. Hunter, district engineer, for J. S. Abercrombie Co. in Old Ocean field



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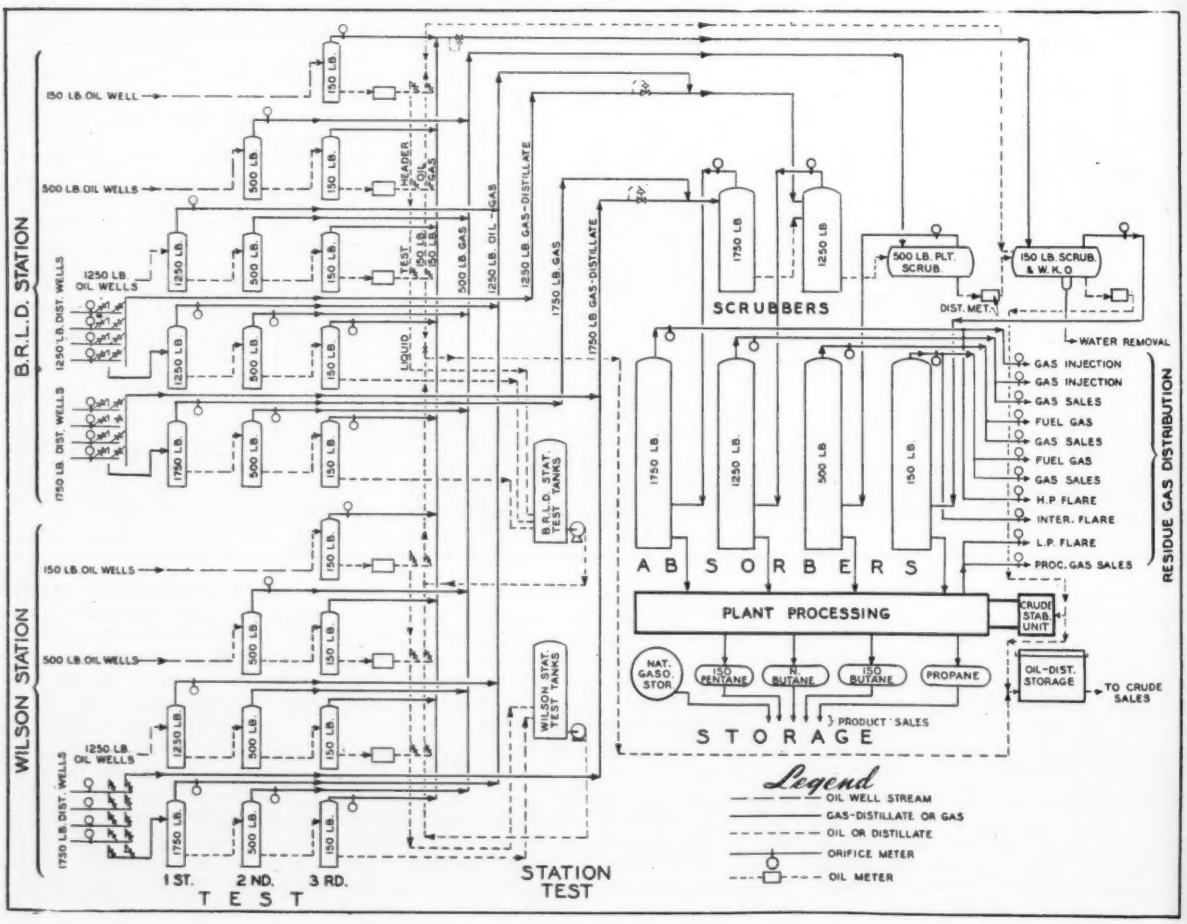

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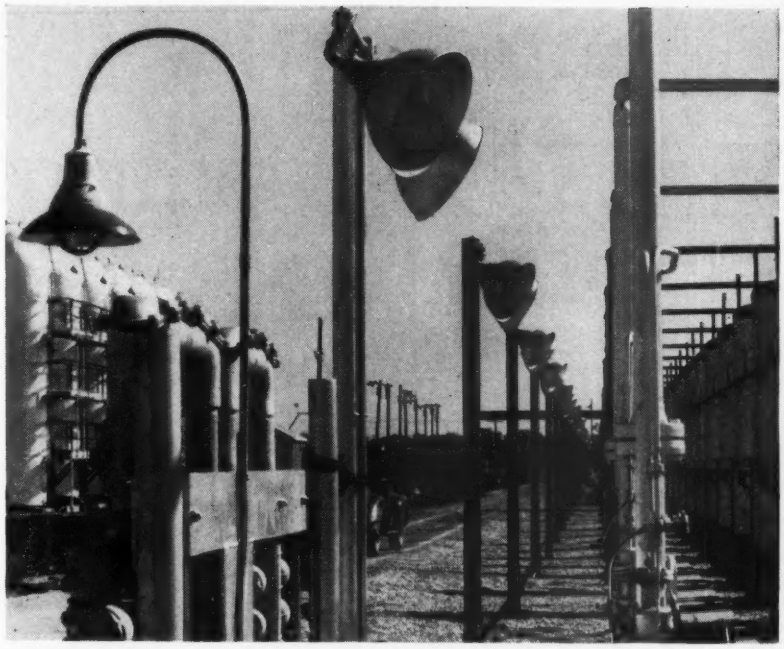

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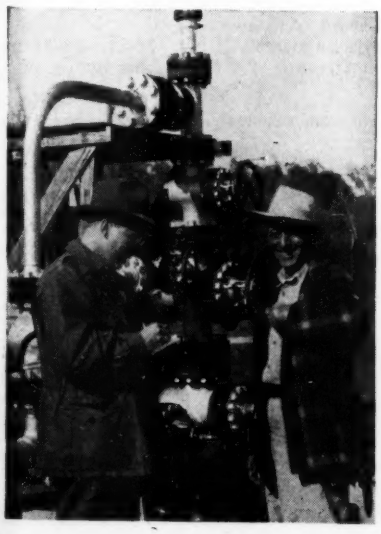

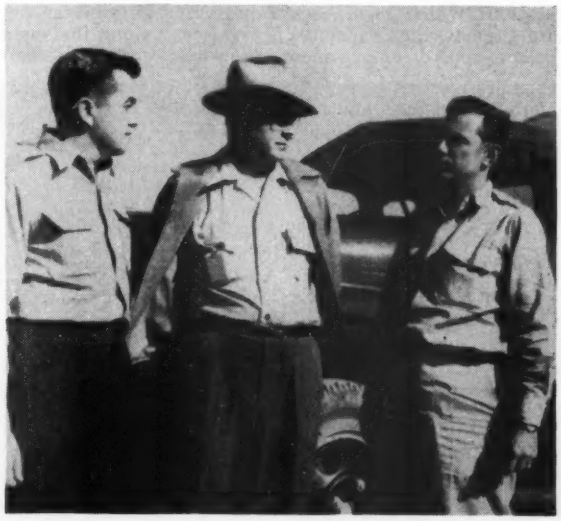

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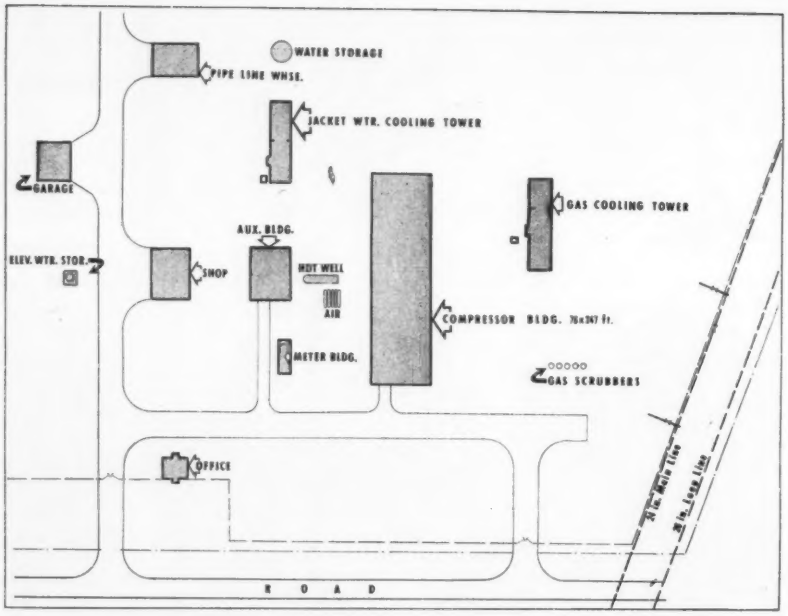


Fig. 1—Typical layout of buildings and equipment for three new stations of Tennessee Gas Transmission Co.

The Author

E. S. Murray, assistant chief engineer, Tennessee Gas Transmission Co., had charge of the design of the three stations discussed in this article. Following graduation from Colorado A. & M. College in mechanical engineering, he was a field artillery officer in World War I. His oil and gas-industry experience in construction, operation, and design includes: 9 years, Midwest Refining Co. natural-gasoline plants, Wyoming; a year with Marland and Pure Oil companies, Oklahoma; 9 years, International Petroleum Co. and Tropical Oil Co., South America; 4 years, Northern Natural Gas Co. and Natural Gas Pipeline Co. of America; 2 years, J. F. Pritchard Co., Kansas City. Since November 27, 1943, he has been engaged in pipe-line and compressor-station engineering and designing for T.G.T.

T. G. T. Stations Equipped With 1,600-Hp. Four-Cycle Compressor Units

by E. S. Murray

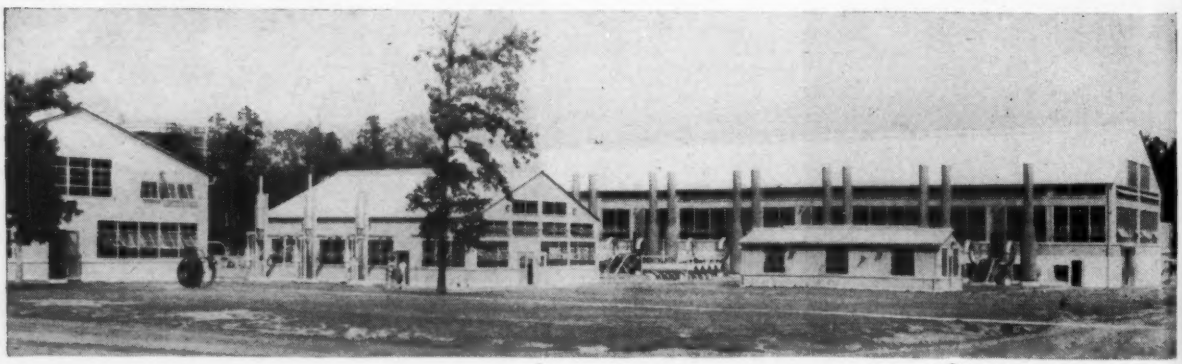
IN connection with the program of Tennessee Gas Transmission Co. for raising capacity from 265,000,000 to 600,000,000 cu. ft. daily, three compressor stations have been built which are equipped with horizontal 1,600-hp., 4-cycle compressor units. This article deals with the design of these stations which have been important for the new high capacity.

The entire enlargement program included the laying of a 26-in. line, paralleling the original Agua Dulce, Tex.-Cornwall, W. Va., 24-in. built in 1944, as well as the raising of compressor horsepower from approximately 110,000 to 222,000 hp. The new compressors were installed at the three stations (to be discussed here), as well as at other stations located along the system at 85-mile intervals.

The enlargement program was completed late in November 1948 to the extent that daily gas sales in excess of 600 M.M.c.f. became a reality on December 1, 1948. In the course of providing additional compressor capacity, it became necessary to build a total of 4 new stations and to install additional compressors at 11 existing stations.

The first fifteen 26-in. 1,600-hp. horizontal T.T.D.A. units were pur-

Fig. 2—J. P. Bristow station, showing shop and maintenance warehouse, auxiliary building, and main compressor building. Fuel-metering building is in the right foreground



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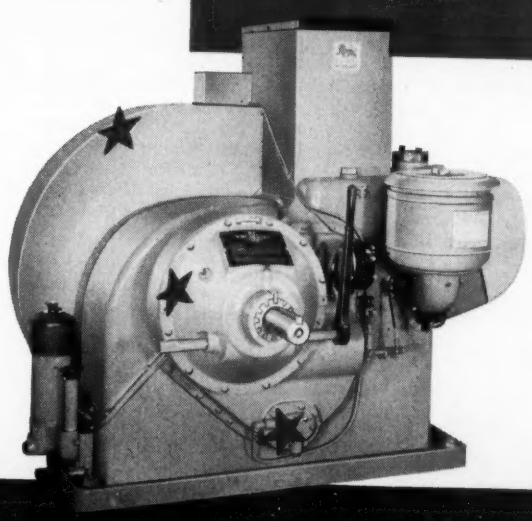

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Dependability

UNITED SUPPLY AND *Manufacturing* COMPANY

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Stores in Kansas, Oklahoma, Texas, Louisiana, and New Mexico

chased in 1946 and five more of the same type were added in 1948 compressors. These 20 engines now are in operation. Units installed in three of the four new stations are located as follows:

No. 1.—Roy S. Nelson station. Seven miles south of Victoria, Tex., contains five units.

No. 3. — John P. Bristow station. One mile south of Fostoria, Tex., contains eight units.

No. 5.—W. E. Mueller station. Four miles northwest of Natchitoches, La., contains seven units.

These stations numbered according to the location along the line are named for officials of the company, a practice applying to all of the compressor stations. Since these three stations were designed and built simultaneously, by company forces using duplicate materials and construction procedure, a description of the J. P. Bristow station will generally apply to all the three stations.

Use of Larger Units

Unit costs of construction are always of prime importance in gas-transmission systems particularly during the postwar years of material shortages and rising basic costs. These stations deviated from the design of the other company stations built during the war, mainly because it became evident that larger compressor units would be most economical in a system obligated to handle at least 600 M.M.c.f. per day. Since the conventional vertical-type two-cycle engines were not available in sizes much over 1,000 hp., it was decided to use the 1,600-hp. horizontal type as a matter of long-term economy even though first costs might be higher.

The general arrangement of shop and maintenance warehouse, auxiliary building, main compressor building, and fuel-metering building is shown in Figs. 1 and 2.

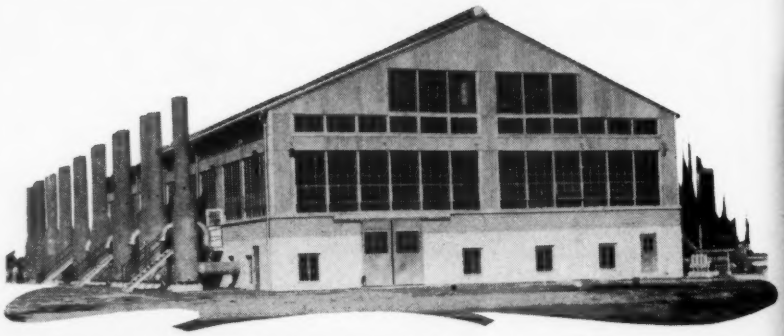


Fig. 3—Permanent end of main compressor building with mufflers and air piping

Beginning at the foundations, the essential points of design are discussed in this article more or less as the actual construction progressed. The main engines are set on concrete blocks, which in turn, are anchored to a concrete mat 24 in. thick, extending beyond the blocks up to the building-wall foundations which were poured separate from the mat.

Spacing of Units

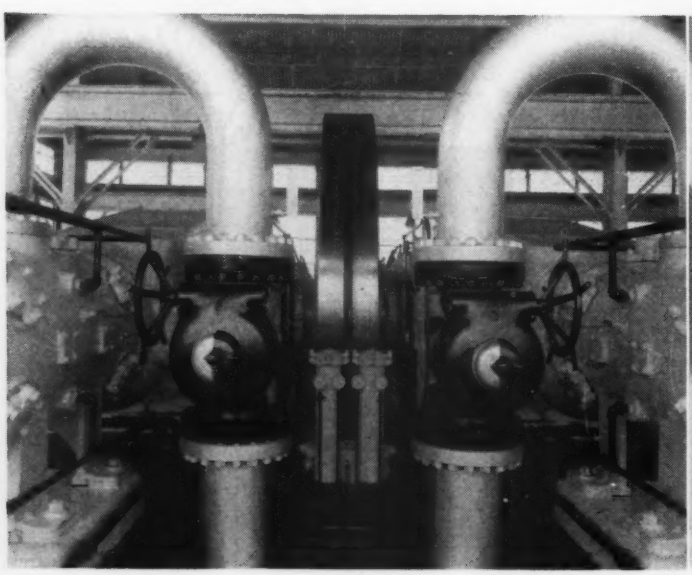
The main building was designed to provide ample working space around the engines and to have ample room for service header piping in the basement. The blocks are approximately 55 ft. long by 19 ft. wide, set on 28-ft. 9-in. centers in a building 247 ft. 4 in. by 75 ft. 11 in. by 27 ft. 6 in. eave height. The blocks contain approximately 338 cu. yd. of reinforced concrete and are finished off with white portland cement below the operating floor. Average pouring time was 8 hours each.

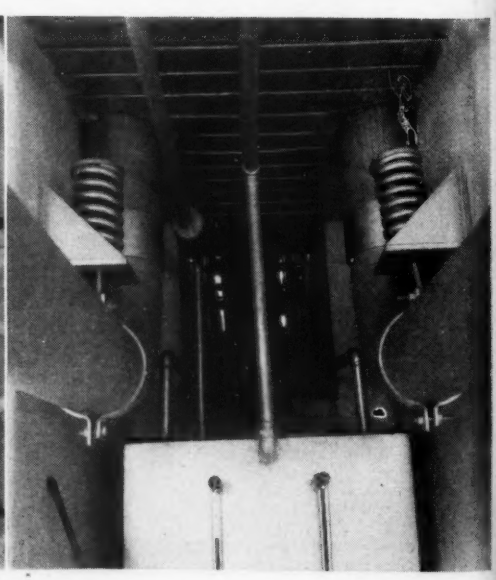
Spacing of the units is greater than ordinarily found in similar stations using 1,350-hp. horizontal units; likewise, the building width was increased so that there would be ample room for erection and for overhauling the units during their operating life. Two 15-ton cranes were installed in the main building, one operating on each side of the center columns.

The main building was set so that the top of the mat is 3 ft. below finished grade. This setting has proved satisfactory for many reasons. Larger windows could be installed well above grade permitting more light and ample air circulation in the basement. These basement windows are 40 by 48-in. hinged on the sides, opening out from the center. A man can get out of these windows with a minimum of effort in case of emergency.

The sliding doors are sized and located so that a truck can be backed through them at grade level when necessary to move heavy engine parts. A concrete landing block was built on the mat up to grade level far enough into the basement to support the rear wheels of the truck, and at

Fig. 4—(Left) Each compressor cylinder has a 180° cast-steel reducing bend with 12-in. inside gas inlet plug valve attached directly to the bend. Fig. 5—(Right) Spring assembly and clamp for supporting 12-in. inlet pipe and for dampening vibrations





Here's why

FABRICATED STEEL POWER END. Fabriform construction provides an extremely rigid, strong and compact unit. Steel skids, built integral with the power frame, considerably reduce pump weight and overall dimensions.

ECCENTRIC ASSEMBLY. One piece eccentric strap equipped with roller bearings at both ends assures quiet, efficient and trouble-free operation. Entire assembly is flood-lubricated from main oil bath.

GEARING. Forged alloy steel herringbone gears maintain perfect axial balance and provide quiet and efficient speed reduction. Two-piece main gear mounted on self-aligning roller bearings.

LUBRICATION. All running parts flood-lubricated by a positive-splash system, eliminating troublesome oil pumps and grease connections. Large diameter, high-capacity roller bearings assure long, trouble-free operation.

CROSSHEADS AND GUIDES. Hard chrome-plated heat-treated steel crossheads run on renewable guides. Heavy duty needle roller bearings used in crosshead pin assembly.

STUFFING BOX COMPARTMENT. Piston rod connects to crosshead extension in large, open compartment for easy piston rod replacement. Power end fully protected against intrusion of mud.

"EXPOSED" LINER. Fluid liners packed off at both ends and exposed to view. This patented construction permits immediate and unfailing detection of mud leakage before serious washouts can occur. Liners can be easily removed as they cannot become locked by sand.

DIRECT FLOW DESIGN. Full openings and large passages permit free, unobstructed fluid flow. This direct flow design assures low fluid velocities and highest volumetric efficiency.

CAST STEEL FLUID END. Electrically-welded, cast-steel fluid end provides maximum strength with minimum weight. The all steel construction of the fluid end permits repairs to be made in the field by the utilization of welding.

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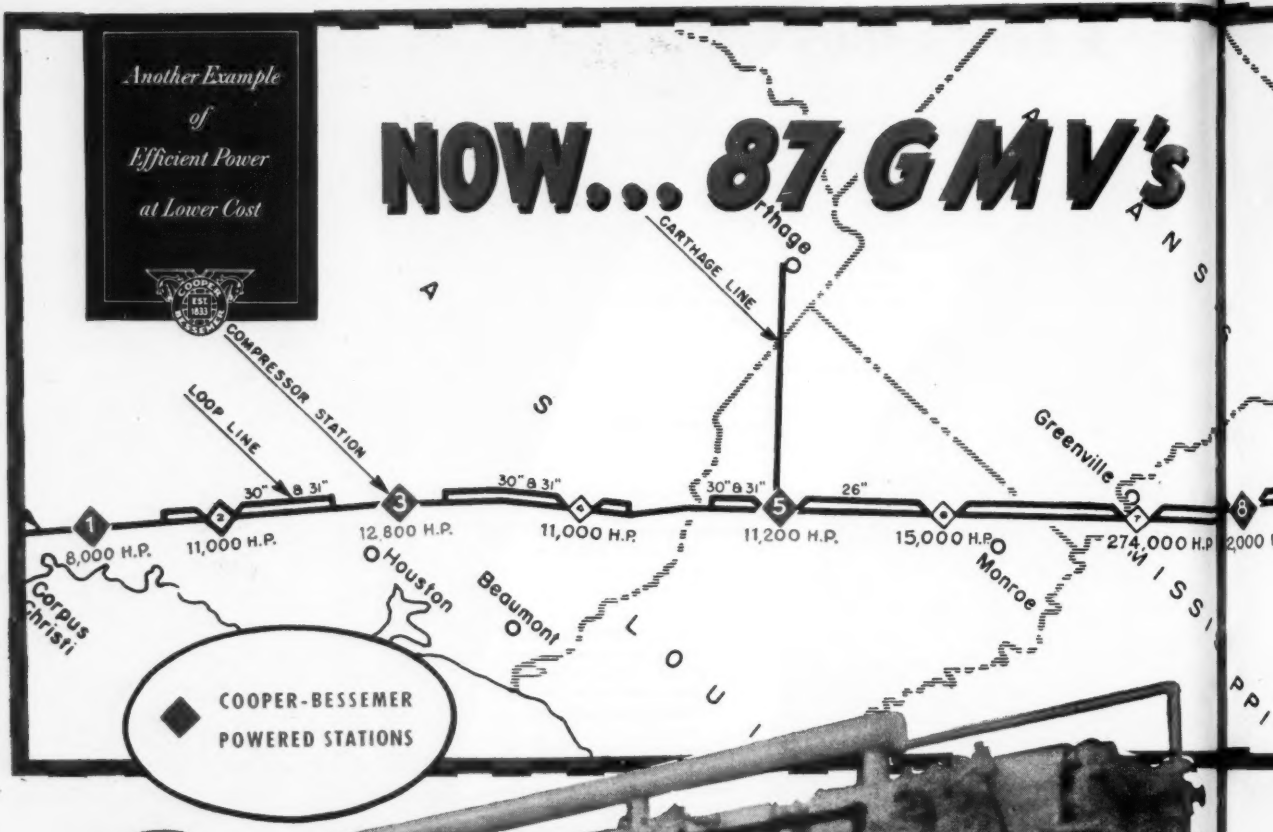
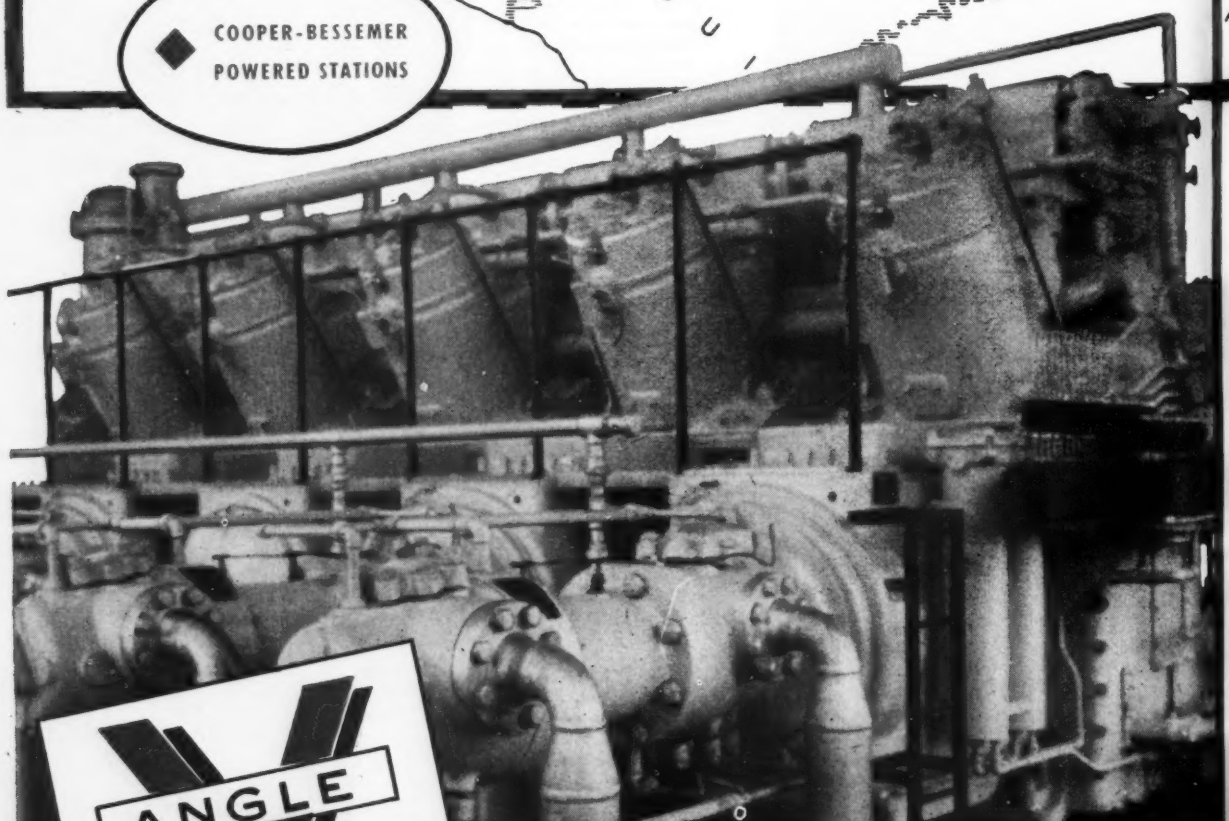




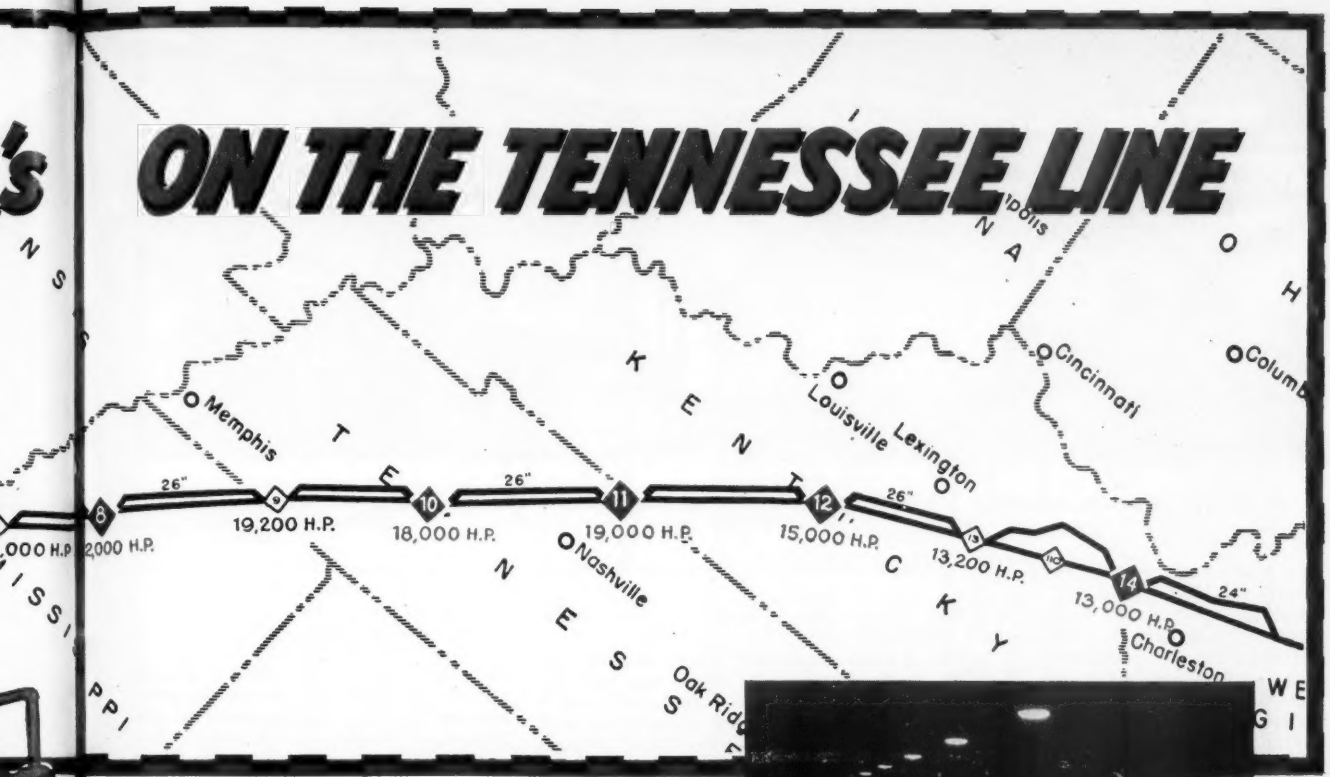
ANGLE V

Compressors

New York Washington Bradford, Pa. Parkersburg, W. Va. San Francisco, Cal. Seattle, Wash

XUM

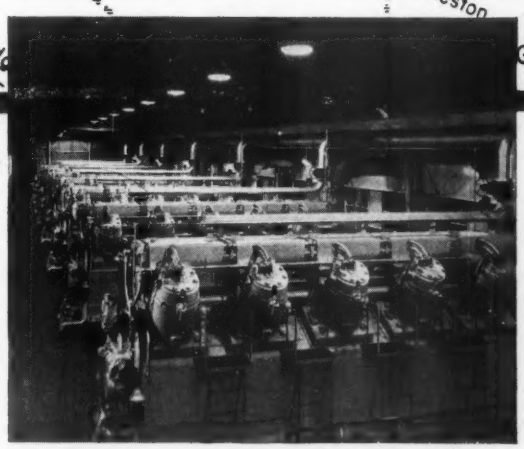
ON THE TENNESSEE LINE



THE story of the Tennessee Gas Transmission Company's big line is one of continuous growth from its beginning in 1944. Present capacity is 600 million cubic feet of gas a day. This year further expansion will add another 60 million cubic feet daily.

The line's engine-driven compressors now total 215,400 hp. Well over half, 119,000 hp, is furnished by Cooper-Bessemer units. Of these, 87 are modern 1000 hp V-angles . . . GMV'S. Still more GMV's are to be added during the year.

On this and other lines GMV performance has proved a point of major importance to compressor users . . . that despite money-saving compactness, GMV's are truly rugged units, with exceptional resistance to wear and freedom from trouble. It adds up to compressor service at the lowest of low cost.



• Note the typical compactness of this 7,000 hp group of GMV's on the Tennessee Line. A GMV from the compressor cylinder side is shown on the opposite page.

You'll be money ahead if your plans call for Cooper-Bessemer V-angles. They are built in three types from 200 to 2400 bhp.

by **Cooper-Bessemer**

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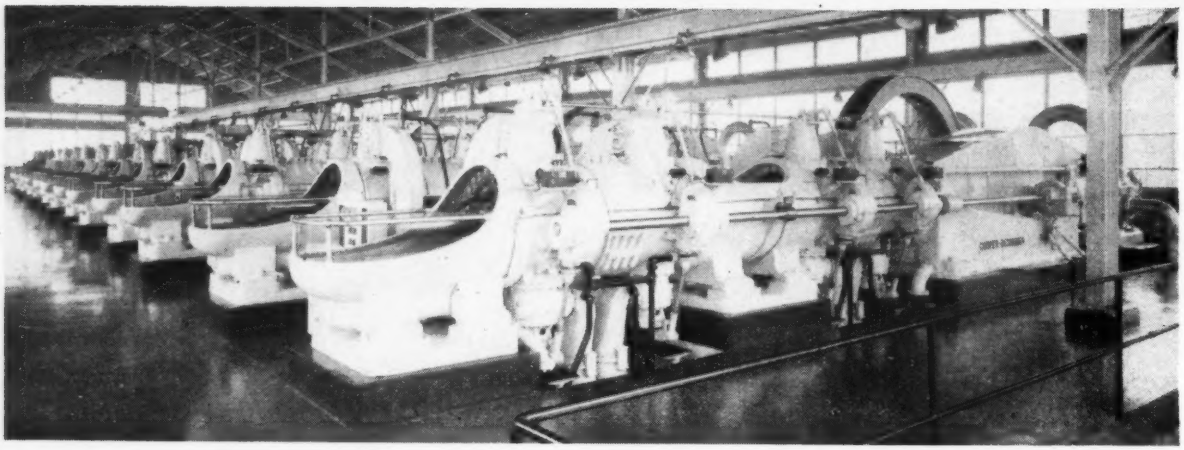


Fig. 6—Main compressor installations at J. P. Bristow station. Loading well with removable guard rail is seen in right foreground

the same time permit the overhead crane to load or unload the truck through an open well in the operating floor. Thus, heavy parts can be handled by the crane without using loading platforms or rollers. A set of inside stairs permits access to loading block, thence to basement floor. This arrangement lends itself to economy and safety in handling heavy parts throughout the life of the station.

The end view in Fig. 3 is typical of the entire building. The steel structure is covered with corrugated Transite except for the window area. The windows are of standard dimensions using Aclo green glass throughout. The two bottom rows of windows are clear to permit ample vision from the operating floor. All other window panes are hammered green glass. At the time these stations were built, clear double-strength industrial-type glass was practically unobtainable. The Aclo green glass was available in various combinations, hence it was used as a substitute. Since installation of this glass, it has been found to be quite durable and, in addition, it provided a means to eliminate nearly all of the glare and about 35 per cent of the heat experienced in direct sunlight. The durability factor plus the elimination of eye strain has proved to be worth the difference in original cost.

The end view in Fig. 3 also shows a very satisfactory method of making weatherproof joints between building siding and curb walls. The Transite is applied in the usual manner with suitable flashing around the windows. Buff colored tile, 3⅝ by 5⅝ in. overall, glazed on the inside and rough cut on the outside, were installed on the top of the 6-in. foundation curb wall. The concrete ledge was then poured directly on top of the tile and around the lower end of the Transite siding and around the steel girts supporting the window sections. Thus, the concrete ledge seals all joints and provides a water-drip table as well as a means to reinforce this joint against heavy winds often encountered along the Gulf Coast.

Since the tile wall is only 5⅝-in. thick compared to a brick wall of 8¼-in. minimum thickness and the cost of laying the tile is less than for laying brick for the same wall area, it was found that the glazed tile wall was actually less expensive in original cost and at the same time the glazed inside surface required a minimum of housekeeping maintenance. To provide ample ventilation so necessary during the summer along the Gulf Coast, a continuous ridge type ventilator was installed with adequate bug screens.

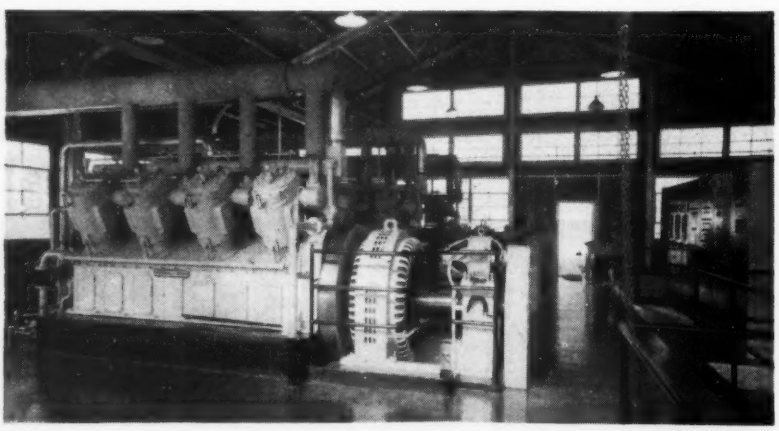
The same photograph shows the type of exhaust silencers used on all engines. These were supplied by Maxim Silencer Co. and so designed that there is an aspiration effect obtained by using two shells and two tubes. The outer shell and tube are visible in the photograph as well as a Transite pipe from the engines. The exhaust gases travel through the steel exhaust pipe into the inner shell, through the inner tube and then pass out through the outer tube together with the air sucked from the basement through the Transite jacket. Thus, ample ventilation of the basement is assured. In addition, it removes enough heat from the steel exhaust pipe to prevent damage to the blocks and to the electric wiring and at the same time maintains comfortable working temperatures in the basement. These silencers are very effective in reducing the noise level around the entire plant.

Gas Piping Details

Figs. 4 and 5 are related in so far as inlet gas piping details have been worked out. Fig. 4 shows one 180° cast-steel reducing bend installed on each gas compressor cylinder with the 12-in. inside gas-inlet plug valve attached directly to the bends. The combined weight of the 180° bend and the plug valve exceeds 3,000 lb., which is more than the allowable loading on the flanges on top of the compressor cylinder. Since the entire unit is subject to lateral movement and the inlet and discharge piping is also subject to vertical vibration, some means of limiting these movements was indicated.

The device shown in Fig. 5 does

Fig. 7—Auxiliary building with generator units



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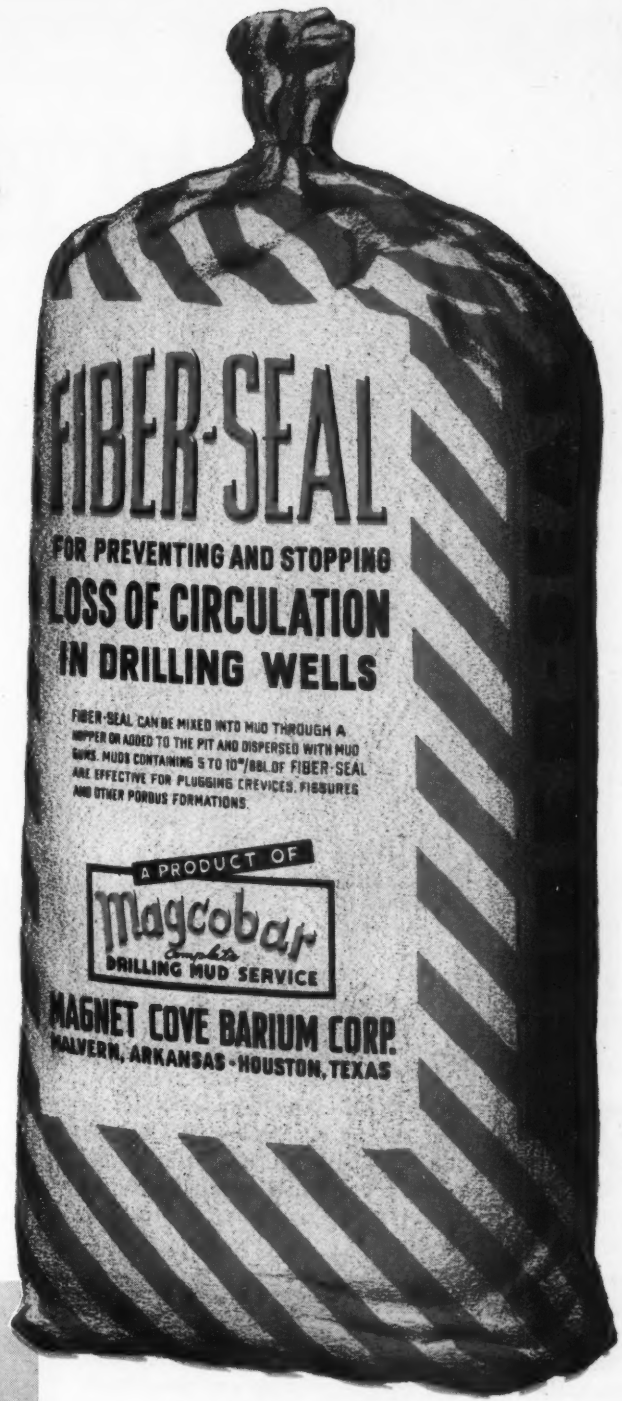
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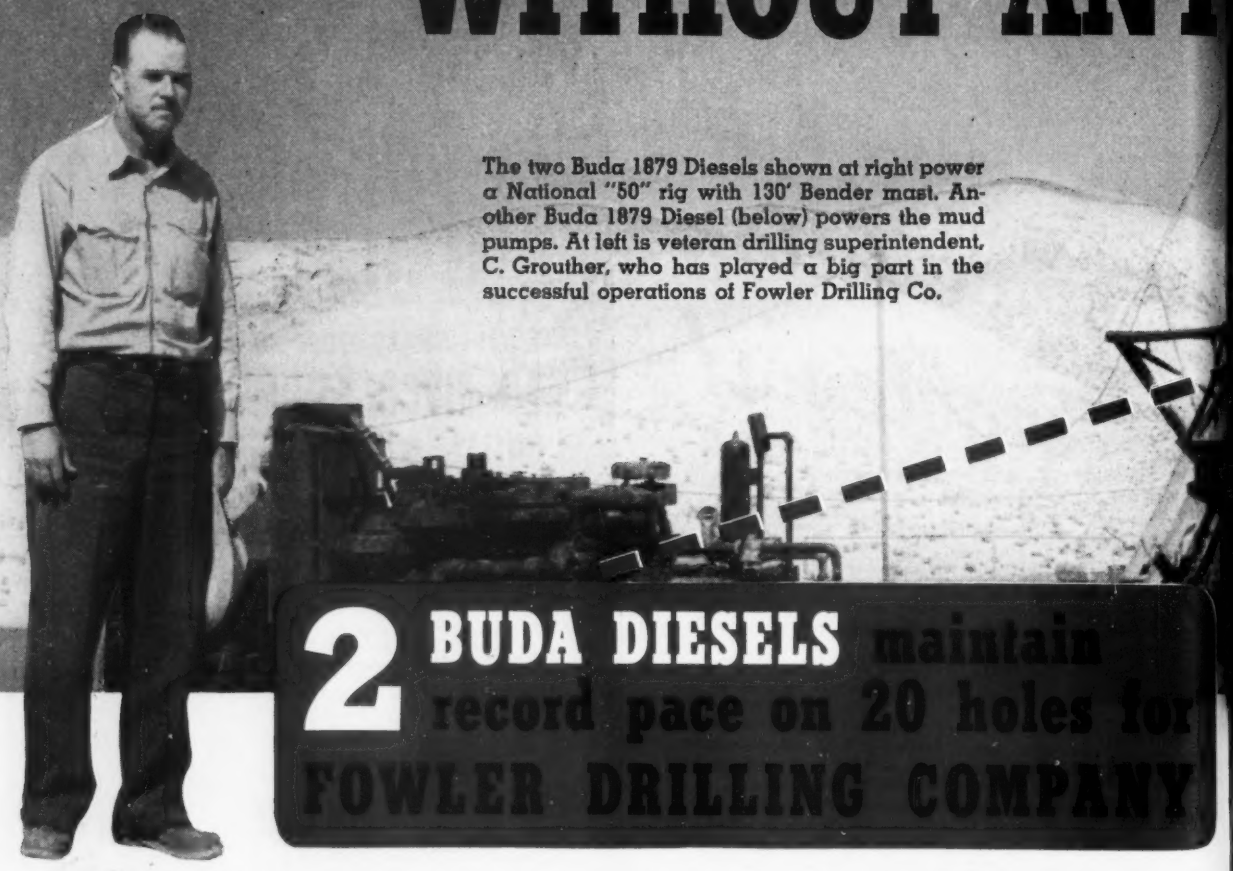

The two Buda 1879 Diesels shown at right power a National "50" rig with 130' Bender mast. Another Buda 1879 Diesel (below) powers the mud pumps. At left is veteran drilling superintendent, C. Grouther, who has played a big part in the successful operations of Fowler Drilling Co.

2 BUDA DIESELS maintain record pace on 20 holes for FOWLER DRILLING COMPANY

20 holes without down-time is a lot of drilling in any oil country. Yet Fowler Drilling Company of Long Beach, Calif., accomplished these results recently with a portable mast-type rig powered by two Buda 1879 Oil Field Diesels.

In the words of "Slim" Fowler, *"We've just completed our 20th hole in 2 years with this rig . . . and except for one 24-hr. period for engine check-up and synchronization, our Buda Diesels have operated continuously for 15,240 hours—without any down-time. Needless to say, we are 'sold' on Buda performance."*

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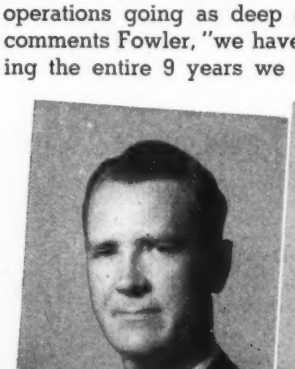
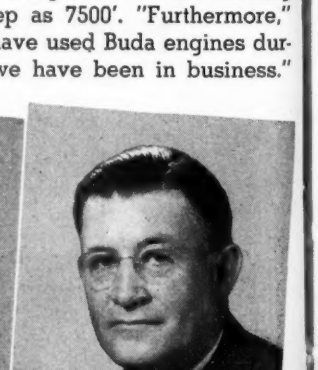


C. L. ("Slim") Fowler.



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Wherever there's oil there's Buda

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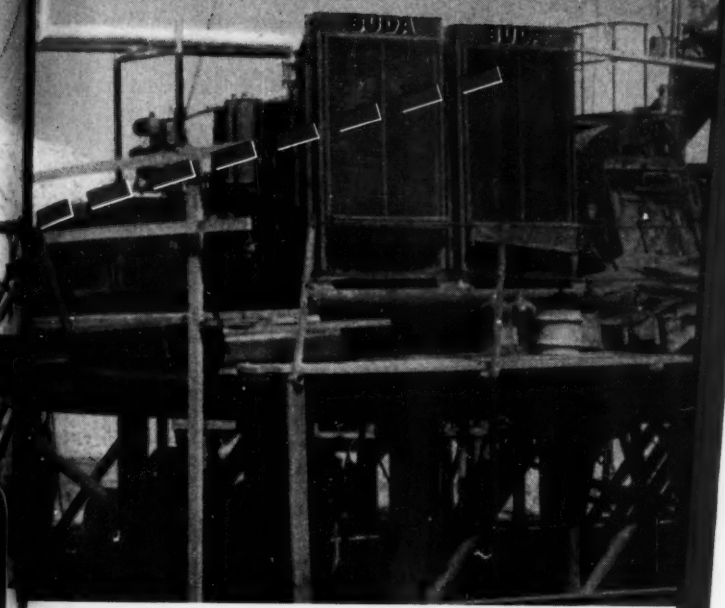

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this very effectively. The two fabricated brackets are bolted securely to the block by three bolts installed when the blocks were poured. Anchor bolts for the clamp shown behind the springs also were installed at the time of pouring. The clamp limits the horizontal movement of the vertical 12-in. inlet pipe particularly on the far side so as to direct the expansion toward the outside header. The spring, spring bolt, and supporting clamp can be adjusted so as to not only take up desired portion of the weight of the piping but also damp out vertical vibrations at the source. This same arrangement was applied on the discharge piping and the results are entirely satisfactory.

Fig. 5 also shows a portion of the under surface of the operating floor, typical of all operating rooms built in the past 2 years. The surface shown is the smooth side to steel hy-rib decking commonly used in fireproof concrete steel buildings. In this instance, the ribs are pointing up instead of down and it so happens that the inverted ribs provide ideal supports for the reinforcing floor steel. The decking was ordered match-marked to fit each bay from Watkins, Inc., supplier of the steel for the main building. It was supported from the steel floor beams by scrap false flooring until the floor had set for 14 days; then the false floor made of scrap lumber was removed.

Shoring up from the basement floor was not permitted since the steel beams should be used for the sole support of the green floor to prevent cracking and settling. The decking was left in place as shown, then brushed clean and painted with aluminum paint for cleanliness and lighting effects. Maintenance is negligible after painting. Since lumber and carpenter work are not used in laying the operating floor, the installation costs were reduced approximately 30 per cent; in addition, cracks in the floor have been practically eliminated.

Fig. 6 is an interior view of the operating floor. The floor was poured monolithically using a dry, red iron oxide, sand, cement mixture troweled into the floor slab aggregate while wet. The color penetrates to a depth of approximately ⅛ in. into the floor slab. Floor blocking, or marking, was purposely eliminated in the interest of cleanliness and polishing. Red wax applied with an electric machine maintains the color and finish at nominal cost. Cracks in the floor have not occurred after 1 year of operation.

Fig. 5 includes a view of the loading well with removable guard rail around it, also a portion of the basement floor.

The compressor units are painted with light gray enamel. The control panel is partly seen, set in between the outboard power cylinders. The open-type roof members are clearly shown, indicating the absence of ordinary truss members. Roof purlins are preformed open-type miniature trusses. Building vibration at these stations is at a minimum. Ignition is provided by two Rectox units with separate leads from the auxiliary switchboard. Either unit can carry the entire load in case of emergency.

The engines have water-cooled exhausts in addition to the Transite aspirating tubes. The cooling water is admitted through an orifice ¼ in. in diameter from the jacket-water cooling system. Individual circuits to the rods, heads, and to the jackets are used in cooling the engines. Inlet-water temperature is held at approximately 135° F. using a closed system wherever possible. Makeup water is at a minimum and the entire circulation volume is first softened, if necessary, and then treated with sodium dichromate.

A lubricating-oil filter system, consisting of a unit with suitable pumps and storage tanks, was incorporated in the original installation. Oil from the settling tanks can be pumped through the filter unit, thence to overhead tanks located in the gable of the main building. Filling-station-type oil meters are used to determine actual consumption of oil. The overhead tanks permit gravity flow of oil throughout the entire length of the engine room, with can-filling stands set up at each main column. Oil temperature is maintained at room temperature by virtue of location. These main compressor units have two 13½-in. diameter compressor cylinders with approximate rating of 65,000,000 cu. ft. per day from normal inlet pressure to 760 lb. discharge pressure at 125 r.p.m. There has been no dificulty in maintaining this performance.

Auxiliary Power, Light

Auxiliary power and light are supplied by three engine-generator units (250-kw., 440-volt a.c.). Fig. 7 shows the interior of the auxiliary building. This building has a full basement containing three 12-in. jacket circulating water pumps; two two-stage horizontal starting air compressors; the oil filter unit, and two makeup and fire pumps. The building is 51 by 62 ft. open-type roof construction, Transite covered, using Aclo green glass similar to the main building. The floor was poured similar to the main building, unmarked and waxed with red color wax.

All inlet gas is passed through inlet gas scrubbers to remove line dust. The discharged gas is cooled in an individual gas cooling tower using open-type atmospheric cooling sections, designed and sized by company engineers to meet the demands of each station. The jacket water is cooled in a separate cooling tower, using open-type cooling sections sized to fit the demands of each station. The entire plant was laid out so as to leave one end of each tower and building available for any future expansion. This procedure has already been proved well worth the designing effort since additions to the original structures were made in 1948 at each plant. Tying in the new additions was accomplished with only minimum shutdown time since provisions had been made for this at the time of original construction.

Housing became a real problem at each of these three stations since the national housing shortage was particularly acute in the Gulf Coast area. The company solved the problem by building 8 houses at station No. 1, 11 at station No. 3, and 11 at station No. 5. The employes' houses are of modern design, wood frame, five-room-bungalow type with enclosed rear porch across the width of the house.

There is a pipe-line district headquarters at each of these stations and facilities for serving pipe-line-maintenance requirements were incorporated in the original design. A pipe-line warehouse 40 by 60 by 12-ft. eave height was built on the same pattern as the auxiliary building. It is steel framed, with a 5-ton traveling crane, concrete slab, Transite covered, using green Aclo glass and tile curtain wall similar to other buildings except for red floor finish. The overhead crane can load the trucks as fast as they move in on an emergency call. Portable lighting units, gasoline-engine-driven sump pumps, welding generators crated or on skids, stand in readiness and within reach of the crane at all times. Large boxes containing tools, boots, shovels, etc., are ready for loading as required. In fact, fire-station technique is approached in procedure when emergency repairs are demanded.

A railroad siding was constructed at stations Nos. 1 and 3 where railroad facilities were economically available. A loading platform with a steel oil-field-type warehouse built upon it was installed along side of the spur tracks or adjacent to a main plant road as is the case at station No. 5. Pipe racks suitable for rail or truck shipments were built near each warehouse to facilitate handlings of pipe movements within the district and to store main-line and feeder piping for future needs.

These stations are equipped with a short-wave radio station and leased-line and toll-line telephone communications. Company-owned essential vehicles are equipped with radios which have been particularly useful in all phases of operation. Since these stations are in the areas served by the 30-31-in. o.d. loops laid in 1948, as well as in areas where field gas gathering systems occur, the importance of constant and dependable communication cannot be over emphasized.

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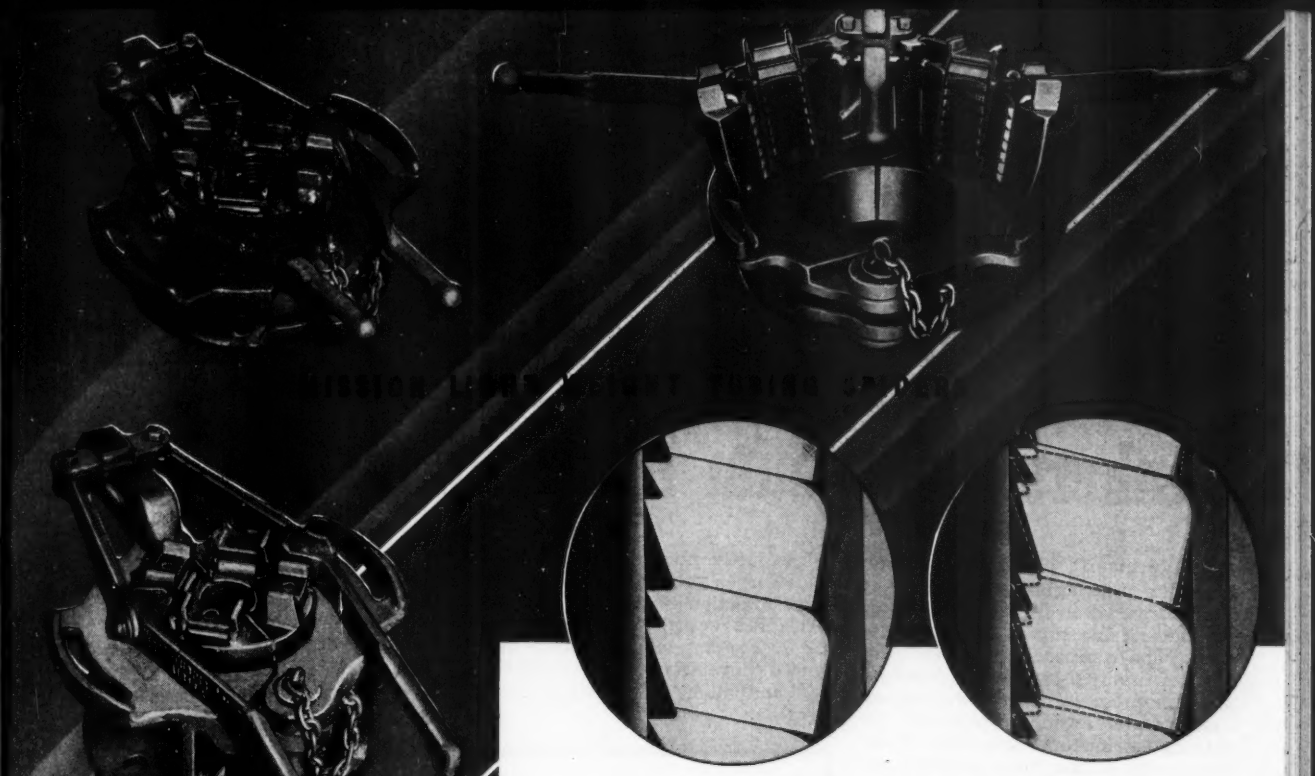

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CORROSION INHIBITION with Chromate

A SERIES — By MARC DARRIN

4. Corrosion Problems in Pipe-Line Systems, Tankers, Petroleum Distribution Equipment

THE principal corrosion problems in the transportation of petroleum products relate to the pipe lines, storage tanks, tank ships, pumping equipment, and the cooling systems for various internal-combustion engines and compressors. Corrosion-resistant coatings and cathodic protection are proving satisfactory for control of external attack, but these methods are not applicable for internal protection. For the latter purpose chromate and bichromate are outstandingly meritorious. Although other inhibitors are employed, both organic and inorganic, only chromium chemicals are sufficiently powerful to provide protection against severely corrosive conditions.

Pipe Lines

Contrary to what might be expected, internal corrosion of pipe lines handling finished products, such as gasoline and kerosine, is more serious than in lines handling crude oil, although there are some exceptions as in the case of the sour crudes from West Texas. Pipe-line systems transporting dry natural gas present few corrosion problems other than those common to pumping stations.

Gasoline Pipe Lines

The use of sodium chromate, or bichromate, in pipe lines for the transportation of finished products, was started several years ago in an old eastern system.[1] This method has proved satisfactory in eliminating corrosion and decreasing frictional resistance to flow. In some instances the frictional resistance is now less than the theoretical for a new pipe line. Apparently this is due to the formation of a film of hydrous chromic oxide which facilitates the flow of gasoline.

The general procedure is to inject by means of a proportioning pump 0.3 to 0.4 gal. of chromate solution per 1,000 bbl. of refined product entering the line. The chromate solution is made to contain about 2.5 lb. of sodium chromate per gallon, and has a pH of about 8. This is equivalent to about 1 lb. of chromate per 1,000 bbl. Some pipe lines employ a more dilute solution but inject a correspondingly larger volume. The first two or three injection stations may be about 100 miles apart, usually 50 to 200 miles. Further injections may be required depending on the length of line and other individual factors.

The above applies to nonacidic products, saturated with water. When the gasoline (natural or ethyl) or kerosine is slightly acidic, or develops an acid reaction during transportation, a more alkaline chromate solution may be employed, up to about

Corrosion Prevention — Summarized Directions

Cooling towers.—Start with 500 to 1,000 p.p.m. bichromate and lower the concentration over a period of 1 to 3 months to the lowest maintained concentration at which protection is satisfactory, usually about 200 to 400 p.p.m. Some systems may employ lower concentrations.

Air conditioning.—Start with about 500 p.p.m. bichromate, and later maintain 200 to 300 p.p.m.

Automobile radiators.—After flushing out antifreeze, add 2 oz. chromate to a cooling system having a capacity of 4 to 6 gal.; this will last for the summer season; flush out before adding antifreeze for the winter season. In warm climates maintain concentration at 1,000 to 3,000 p.p.m. by adding an ounce of chromate about once a year.

Locomotive diesels.—Add ½ lb. of chromate to systems having a capacity of about 100 gal., and maintain concentration at 500 p.p.m.

Marine diesels.—Start with about 1,000 p.p.m. chromate in the engine-jacket system, and maintain this concentration. Submarines and some other naval vessels provide an additional factor of safety by employing 5,000 p.p.m.

Stationary diesels.—Start large installations with closed engine-jacket systems by adding 1,000 p.p.m. bichromate; later maintain about 400 p.p.m.; for small installations employ higher concentrations; for open systems, use same procedure as for cooling towers.

Refrigerating brines.—Maintain 125 lb. bichromate per 1,000 cu. ft. of sodium chloride brine, or 200 lb. for calcium chloride brine. These concentrations are equivalent to 2,000 and 3,300 p.p.m., respectively, and correspond to recommendations of American Society of Refrigerating Engineers.

Ammonia condensers.—For recirculating open systems employ same procedure as for cooling towers; for enclosed recirculating systems employ same method as for stationary diesels.

Ammonia absorption systems.—Maintain a concentration of 2,000 to 4,000 p.p.m. chromate.

Standby boilers.—To the water in idle boilers add about 200 p.p.m. chromate.

Operating boilers.—Add sufficient chromate to the feed water to maintain 300 to 400 p.p.m. in the blowoff. Do not use in boilers operating above 200 psi. without consulting competent engineer.

Steam-heating boilers.—Start with 4 oz. chromate per 100 sq. ft. of radiator, or per 15 gal. of water capacity, and maintain 1,000 to 2,000 p.p.m.

Hot-water heating.—Start with 8 oz. chromate per 100 sq. ft. of radiator, or per 30 gal. of water capacity, and maintain 1,000 to 2,000 p.p.m. Do not connect to city water system.

Mercury-arc rectifiers.—Follow manufacturers' directions which usu-

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pH 11. Since this requires the addition of alkali, it is more economical and just as convenient to make the solution from sodium bichromate plus caustic soda. If an acidic gasoline has been partially dehydrated to reduce its corrosiveness, it is still desirable to inject chromate to provide further protection. This treatment has caused the amount of scale and other debris to drop from several gallons to less than 2 qt. per day; but thus far no particular change has been noted in the frictional resistance of a partially dehydrated gasoline, and it may be that the presence of a small excess of water is necessary for the formation of a friction-reducing film. Compared with sodium nitrite[2] and other corrosion inhibitors which are used in gasoline pipe lines, chromate has the advantage of low cost, simplicity of application, visual control, and effectiveness in the presence of acidic water, entrained air, and bimetallic contacts.

Pump Stations

Although many stations were electrified during the war period, due in some instances to a shortage of diesel equipment, there are a large number where power is supplied from diesel or gas engines. These include crude-oil pumping and natural-gas compressor stations, as well as those handling finished products. The method of using chromate in the engine-cooling systems for these stations is the same as described for gas-processing plants in the third of this series of reports.

Storage Tanks

Large storage tanks comprise an important link in the transportation of oil. Chromate will effectively inhibit corrosion by the separated water layer at the bottom of a tank, but the virtual insolubility of commercially available hexavalent chromium chemicals in hydrocarbons precludes benefit to tank surfaces above the water level. A satisfactory solution to the over-all problem of storage-tank corrosion cannot be suggested at this time.

Tank Ships

Corrosion in oil tankers is not amenable to simple treatment with chromate for reasons mentioned in the preceding section on storage tanks. Temporary protection has been obtained by spraying the inside tank surfaces with a film-forming composition containing chromate or bichromate in an aqueous vehicle. Colloidal clays and sulfonated oils are the principal additives, yielding a retentive film which holds the corrosion-inhibiting chromate. Promising developments are to be anticipated along these lines.

Marine Diesels

In the cooling systems of diesels on ocean-going ships and submarines, sea water is pumped through the shell of a water-to-sea-water heat exchanger and thence to waste. Chemical inhibition of corrosion is impracticable in the once-through sea-water side of this equipment. Methods of combating sea-water corrosion include the use of corrosion-resistant alloys, paints, and galvanizing. Because of the scarcity or expense of corrosion-resistant metals, some ships are supplied with "sacrificial" replacement parts, usually short lengths of flanged steel pipe which are used where steel pipes join brass or bronze fittings.

Correct design also can reduce corrosion since there are critical velocities of flow at which corrosion is at a minimum. Of course precautions should be taken to prevent the entrance of marine organisms which may grow on heat-exchanger surfaces and thus impair the rate of heat transfer, as well as accelerate corrosion.

The recirculated jacket water which passes through the sea-water cooler is protected by chromate, the concentration commonly employed being about 1,000 p.p.m. Although a lower concentration would suffice, this would not effect any net economy since it would not reduce the rate of consumption of chromate. Submarines and other naval ships maintain a concentration of 5,000 p.p.m., in order to decrease the frequency of inspection and provide a reserve in the event of leakage or other loss.

Tank Trucks

The engines of automotive equipment are cooled by water which is pumped in a closed circuit through the engine jacket and radiator. The desired temperatures are maintained by means of thermostatic valves. Corrosion may occur in the engine jacket, circulating pump, thermostatic valves or radiator. Since combinations of copper, brass and other metals are used in the construction of these parts, there is danger of serious bimetallic attack. Fortunately this is

for Typical Chromate Applications

ally provide for maintenance of 5,000 p.p.m. chromate in the closed cooling-water system.

Car tracks.—Add 1 to 2 per cent bichromate to the salt which is used to melt ice and snow.

Gas-condensate wells.—Inject into the annulus between the tubing and casing a bichromate solution at such a rate as to maintain 50 to 500 p.p.m. in the water which separates at the well head.

Oil wells.—Introduce sufficient bichromate into the drilling mud to maintain a concentration of 2,000 to 3,000 p.p.m. in the water.

Gasoline pipe lines.—Inject into the suction side of the station pump a chromate solution at a rate which maintains a positive test for hexavalent chromium at the discharge end of the pipe line, or at the next pump station where chromate solution is injected, usually 50 to 200 miles.

Industrial coolers.—For open systems follow the same general directions as for cooling towers; for closed systems follow the same directions as for stationary diesels.

Hydroblasting.—Add 40 to 100 p.p.m. bichromate to the makeup water.

Hydraulic lifts.—Add 1,000 to 2,000 p.p.m. chromate.

Hydrofilters.—Same as for air conditioning.

Rolling mills.—Same as for stationary diesels.

After bonderizing.—Rinse the work in a solution containing 9 oz. chromic acid per 100 gal. of water; maintain pH and hexavalent chromium content by suitable drawoffs and additions.

Stripping anodic films.—Immerse the work 5-15 minutes in a boiling solution containing about 2.5 per cent phosphoric acid inhibited with 2 per cent chromic acid. Sulfuric acid stripping baths are prepared in a similar manner.

Magnesium treatment.—Immerse the work 1-2 minutes in a bath containing about 20 per cent of concentrated nitric acid, inhibited with 15 per cent bichromate.

Other metal treatments.—There are many other kinds of metal dips, both acid and alkaline, for various metals and a variety of purposes, wherein hexavalent chromium serves to inhibit or control the rate of solution of the metal, or to promote the formation of a protective chemical conversion film. An example is the chromate treatment of zinc or cadmium plated metal. In these treatments the most important detail is to maintain the concentration of hexavalent chromium and the pH found best for the particular purpose, as by periodic drawoffs and replenishments of consumed chemicals. Other important details are temperature, time of immersion, cleaning and preparation of surface prior to treatment, rinsing after treatment, manner of supporting and handling the work, and drying.

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not difficult to combat by means of chromate, the customary dosage being about 2 oz. for a cooling system which has a capacity of about 6 gal. This is sufficient to last for a summer season, during which time the chromate will loosen and help to remove old rust which may be present. Either sodium chromate or bichromate may be used. Sometimes potassium chromate or bichromate is used because these compounds are not affected by atmospheric moisture.

At the start of the winter season the system should be drained and flushed before filling with antifreeze, since some antifreeze compositions are reactive toward chromate. Although there have been marketed in this country and Canada over 50 proprietary antifreeze compounds containing calcium chloride, these are all corrosive and very destructive of engine parts. No concentration of chromate or other inhibitor has been found capable of inhibiting corrosion in a calcium chloride antifreeze, at temperatures encountered in an engine-cooling system.

Locomotive Diesels

Lower concentrations of chromate are employed with locomotive diesels than with trucks. This is because a better quality of water is generally used and the entire system is subject to more rigorous inspection. For a new locomotive diesel, using about 100 gal. of water in a closed system, it is customary to introduce ½ lb. of sodium chromate and maintain a concentration of 500 to 600 p.p.m. by small additions as may be indicated from time to time by the depth of yellow color of the jacket water. This treatment is sufficient to eliminate rust and provide a high cooling efficiency at all times. Old equipment should first be thoroughly cleaned to free from accumulations of scale and rust.

Chromium chemicals have many specialized applications in the formulation or use of products derived from petroleum. Some are still in the developmental stage or have only limited applicability. Typical examples include inhibitor capsules for motor-fuel tanks, soluble cutting oils, slushing compounds, inhibitive paints, and the like.

Motor-Fuel Tanks

Although unsuited for large tanks, inhibitor capsules or small packages containing potassium chromate or bichromate are used for aircraft fuel tanks, particularly those constructed of aluminum. Potassium chromate in a specially graded crystal form is suited for this purpose because it may be introduced in cloth bags. Another reason that the potassium salt is more desirable than the sodium compound is that less is used for a given amount of water which may separate from the gasoline or accidentally find entrance into the tank.

Calcium chromate and strontium chromate, though not yet commercially available in a suitable form, possess almost ideal solubility characteristics for this application. Further developments may be expected with low-solubility inhibitors, and their method of introduction into automobile fuel tanks. This application is similar in principle to the introduction of cast chromate sticks into gas-condensate wells, as described in the second of this series of reports.

Soluble Cutting Oils

Sometimes cutting oils become corrosive toward machine work. Immediate relief from this condition may be obtained by adding about 100 p.p.m. of sodium chromate to the cutting oil. This eliminates the necessity of dumping and making up a new mixture. Of course precautions must be taken not to allow chromate-containing oil to remain in contact with the skin.

Slushing Compounds

These compounds range from thin oils to thick greases, and are used for temporary protection of metal surfaces. For the most part they are made from petroleum distillates and a corrosion inhibitor. Several government specifications* provide that the inhibitor be in the form of a water-soluble chromate. These slushing compounds are employed to protect pipe threads and machined surfaces on equipment used by the oil and gas industries, as well as for the protection of military materiel. Though not yet commercially available, it may be that suitable organic compounds of hexavalent chromium will be found having solubility in petroleum derivatives, thus avoiding the necessity of emulsification and attendant limited stability over rather narrow temperature ranges. Here again, further developments may be anticipated.

References

1. Schad, H. G., "Symposium on Combating Internal Corrosion of Products Pipe Lines," 24th annual meeting A.P.I., Chicago (1943).

2. Wachter, A., Ind. Eng. Chem., 37, 749 (1945).

*Navy Ordnance Specification OS-1166 for gun slushing compound "B" provides not less than 0.10 per cent water-soluble chromate, OS-627 for gun slushing compound "A" provides not less than 0.15 per cent. Maritime Commission 52-MC-602 provides for light grade, not less than 0.15 per cent; for medium grade, not less than 0.15 per cent; for heavy grade, not less than 0.10 per cent plus 20 to 23 per cent zinc chromate; and, for firm grade, not less than 0.10 per cent sodium chromate.

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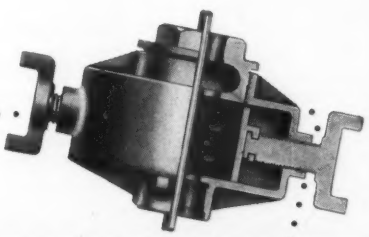

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Atlanta Field, Arkansas

Fig. 1—(Above) Structure map of Atlanta field—contours are drawn on top of the Smackover limestone

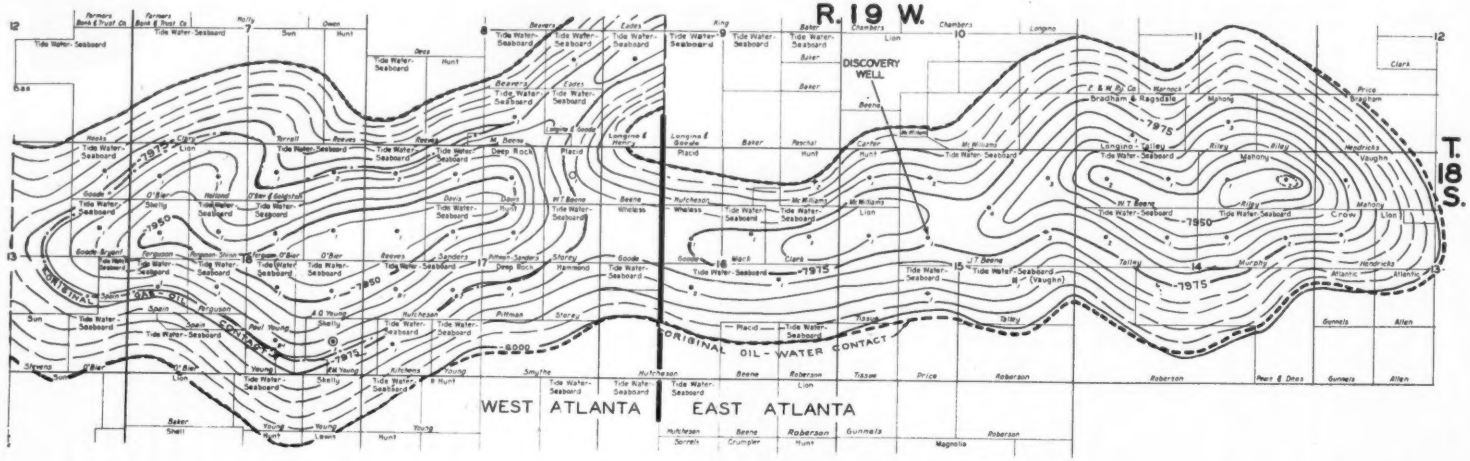

Fig. 2—Structure map of Atlanta field, with contours drawn on top of first porosity

LEGEND

- WELLS PRODUCING FROM SMACKOVER LIMESTONE
- WELL DRY IN SMACKOVER LIMESTONE
- WELL PRODUCING FROM COTTON VALLEY SANDSTONE
- WELL PRODUCING FROM COTTON VALLEY AND SMACKOVER
- WELL ABANDONED IN SMACKOVER LIMESTONE
- WATER INJECTION WELL

BEGINS SECOND DECADE OF PRODUCTION

by C. H. Riggs*

ATLANTA oil field in Columbia County, Arkansas, is one of a group of oil fields in southern Arkansas that produce petroleum from the Smackover limestone and are similar in many of their reservoir characteristics. Discovery of oil in the Smackover limestone in Snow Hill field in 1936 led to a search over much of southern Arkansas for oil in that formation. Geophysical methods were employed to determine the attitude of the rocks below the mid-Cretaceous unconformity. Seismograph proved useful in locating structures, and during the next few years Schuler, Buckner, Magnolia, and Atlanta fields were located and developed.

Drilling of Tide Water Associated Oil Co. and Seaboard Oil Co. of Delaware 1 J. T. Beene, SE NW 15-18s-19w, Columbia County, Arkansas, began September 12, 1938, on a structure located by seismograph surveys. The well was completed on December 8, 1938, at a depth of 8,332 ft. as the discovery well in Atlanta field. Initially the well produced 202 bbl. daily of 44°-A.P.I.-gravity oil through a ⅛-in. surface choke with casing perforations between 8,212 and 8,220 ft. Subsequent development of the field proved the discovery well to be close to the axis of the structure but west of the highest part of the dome. After preliminary testing, the well was shut in until April 1939 awaiting a pipe-line outlet.

*Petroleum engineer, U. S. Bureau of Mines, Bartlesville, Okla. This article is a condensation of Bureau of Mines Report of Investigations No. 4455, "Petroleum Engineering Study of Atlanta Oil Fields, Columbia County, Arkansas," which will be released in the near future (with 23 illustrations and 10 tables). Copies will be obtainable from the Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh 13.

Wells drilled during the next 2 years determined the north and east economic limits of oil production. The existence of a structure in the West Atlanta area in 17 and 18-18s-19w, was indicated by seismograph surveys. Discovery well in West Atlanta field was Tide Water and Seaboard 1 A. O. Young, NE SE 18-18s-19w, completed June 1, 1943, in the Smackover limestone at a depth of 8,356 ft. Initial production was 347 bbl. daily of 44°-A.P.I.-gravity oil produced through casing perforations between 8,294 and 8,300 ft., with a ¼-in. surface choke, and with a tubing pressure of 1,500 psi.

Subsequent drilling proved that Atlanta and West Atlanta fields were parts of the same field connected by a narrow structural saddle. Development in West Atlanta field progressed slowly because of shortages of casing and equipment during the war. Two wells were completed along the north edge of the field early in 1947. These wells indicated a considerable extension of the field in 9-18s-19w. To July 1, 1947, a total of 57 wells had been drilled in the field, of which 54 were producers in the Smackover limestone, 1 in the Cotton Valley sand and 2 were dry holes. Fifty of the Smackover limestone wells were still producing and four had been abandoned.

Reservoir Conditions—Smackover Limestone

The structure of Atlanta field, as shown by contours drawn on top of the Smackover limestone (Fig. 1), is an east-west anticline divided by a saddle into East and West fields. As the structure at the west and north edges of the field was not definitely determined when this study was made, the contours were left open. Development operations in 9-18s-19w were still in progress at that time with the probability that the field would be extended in that area.

West field is structurally higher than East field, the highest well in the former being about 34 ft. above the saddle between the two areas as compared with 28 ft. above for the highest well in East field. Structure in West field is accentuated by the northeast-southwest crossfolding.

The structure of the upper surface of the first "porosity" of the Smackover limestone is shown in Fig. 2. As is explained later, the top of this zone does not correspond with any definite stratigraphic horizon, and consequently the structure of this "pseudo surface" differs from that shown in Fig. 1. The main axis and general configuration of the contours shown on the maps of both figures are similar.

With the exception of a bed of anhydrite 25 to 35 ft. below the top of the Smackover limestone, recorded in logs of wells in the eastern part of the field, no definite stratigraphic horizons in the Smackover limestone have been identified from cores or logs. Apparently porous zones do not conform to stratigraphic horizons but grade laterally and vertically into tighter limestones, depending on the amount of cementing material between the grains. Although a few cores show solution channels in the limestone, most of the porosity is of the interstitial type between the round oolites. In the western part of the field the upper beds are more porous than lower beds but no such relation is apparent elsewhere in the field.

The permeability of the Smackover limestone varies widely both horizontally and vertically. The average

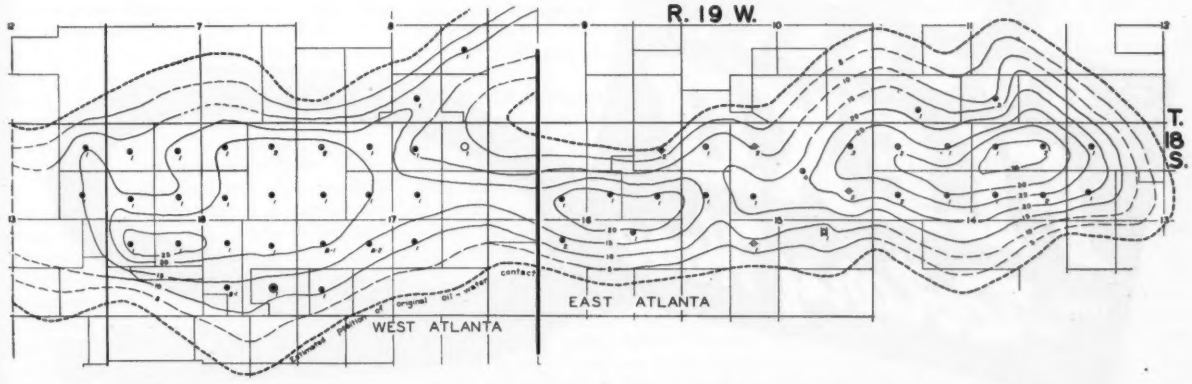

Fig. 3—Isopachous map showing net thickness of high producing zone. Contour interval is 5 ft.

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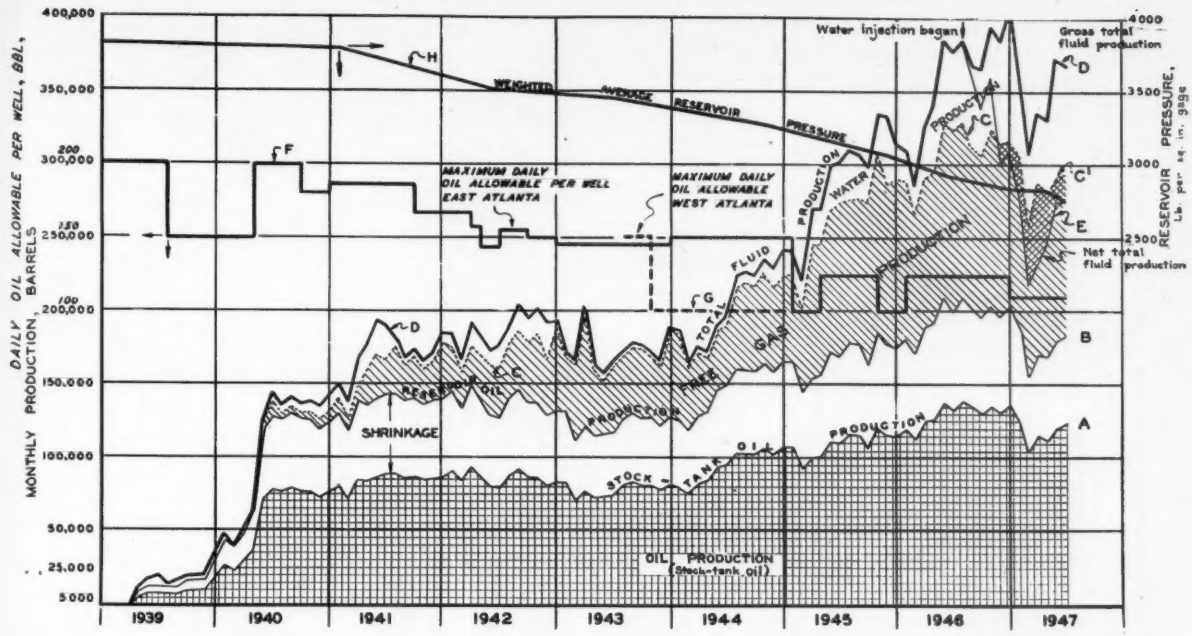

Fig. 4—Fluid production history, Atlanta oil field, Columbia County, Arkansas. Curve A to base line = oil production at standard conditions. Curve B to base line = oil production at reservoir conditions. Curve B to Curve A = shrinkage of oil to standard conditions. Curve C to Curve B = volume of free gas produced at reservoir pressure and temperature. Curve D to Curve C = volume of water produced at reservoir pressure and temperature. Curve D to base line = total fluid production at reservoir pressure and temperature. Curve D to Curve E = total water injected. Curve D to Curve C' = injected water produced. Curve C' to Curve E = injected water remaining in reservoir

horizontal permeability of cores from two wells on the same lease were 20 and 688 md., respectively.

Measurements on the same core sample disclosed that vertical permeability usually was only slightly less, than the horizontal permeability. Average permeability of a zone above the oil-water contact, 15 ft. thick, was 560 md. as compares to 1,090 md. for the main body of the oil reservoir and 1,150 md. for the gas reservoir in the western part of the field.

Original gas-oil and oil-water contacts.—Core analyses and other data indicate a gas cap in West Atlanta field of several hundred acres. The exact position of the original gas-oil contact is uncertain because wells in West field were drilled after oil and gas withdrawals from East field had reduced the reservoir pressure and after some solution gas had been liberated. Based upon all available data the original gas-oil contact was fixed at between 7,970 and 7,976 ft. below sea level in the area of each well in the West field. The edge position of the gas-oil contact is shown by the dot-dash line in Fig. 5.

Thirteen wells in Atlanta field were drilled through the oil-saturated portion of the Smackover limestone and into underlying water-saturated limestone below. Electric logs and core-analyses data from these wells indicate the oil-water contact was at a depth of approximately 8,000 ft. below sea level. The water level was higher in structurally high wells than in wells along the flanks; at a subsea depth of 7,995 ft. in stratigraphically lower beds on top of the structure and at about 8,002 ft. below sea level in the off-structural wells.

Reservoir volume.—Cores from individual wells showed that some zones are of low permeability, through which fluids would move only under relatively high-pressure differentials. For practical purposes zones having air permeabilities of less than 10 md. were considered nonproductive. On this basis the total net thickness of oil sands above the oil-water contact (both penetrated and unpenetrated) and below the gas-oil contact, as calculated from logs and cross-sections, by isopachous maps are shown in Fig. 3.

Based on Fig. 3 and the results of porosity determinations on cores from 34 wells in Atlanta field the oil reservoir was calculated to include 8,042 acre-ft. of void space and the void spaces in the West Atlanta gas cap were calculated to be about 1,630 acre-ft.

Interstitial water.—In Atlanta field all cores were cut while aqueous drilling fluid was being circulated, and consequently measured water saturations have little, if any, relationship to the original interstitial-water content. Recently the restored-state method for determining original water saturation of the reservoir rocks by brine displacement from cores has been accepted by petroleum engineers as providing information usable in estimating the connate-water content of oil-bearing rocks. Twenty-six cores from four wells along the north edge of Atlanta field were tested by this method.

It is recognized that there is no sharp demarcation between the fluids at the so-called oil-water and oil-gas contacts. It is assumed that the lower portion of the Atlanta reservoir included a transition zone in which the original water saturation increased downward from the minimum water content at 7,987 ft. to about 81 per cent at 8,000 ft. below sea level. Average permeability of the reservoir rock in this transition zone was 760 md. From permeability - saturation data volumetrically weighted average water saturation of the transition zone was calculated to have been about 41.8 per cent. Above the oil-water transition zone the average connate water content of the oil zone was found to be 25.9 per cent and for the gas zone 25.0 per cent.

Volume occupied by gas and oil.—The gas cap in West Atlanta field included 1,630 acre-ft. of pore spaces with an average interstitial water content of 25 per cent. Based on average residual oil saturation of 31 core samples from the gas cap, about 4 per cent of the voids was assumed to have been filled originally with reservoir oil. Although the increase in the percentage of one fluid replacing another probably is transitional, the gas-oil contact may be assumed to be at a definite horizon around each well. Seventy-one per cent [100 — (25 + 4)] of the pore spaces between the gas-oil contact and the top

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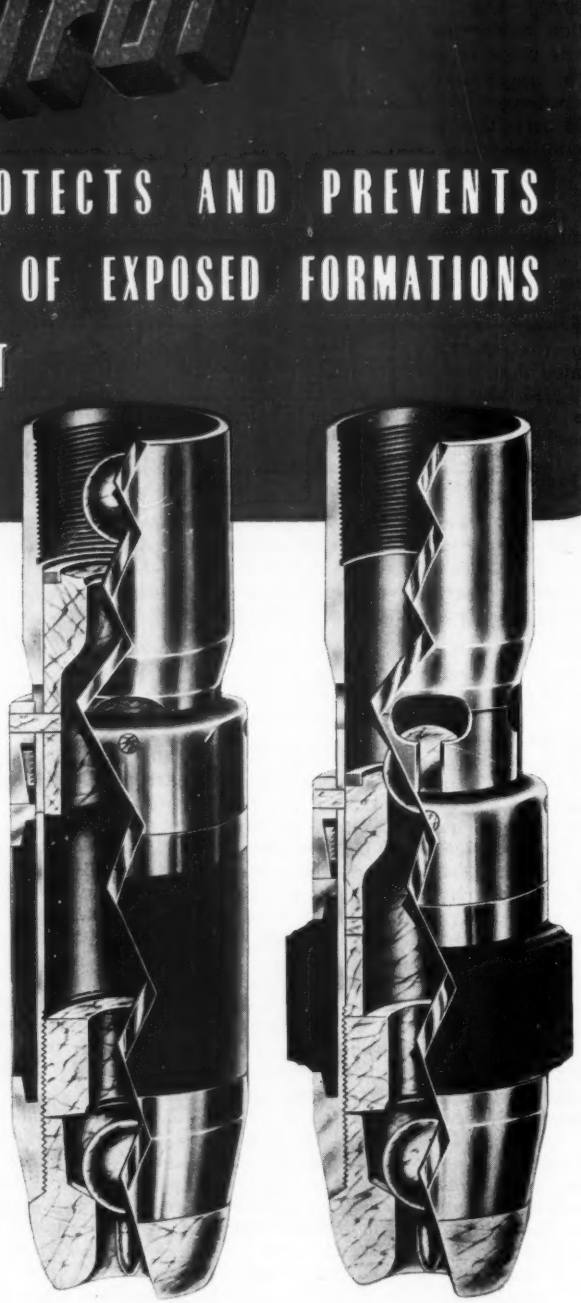

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of the productive zone was assumed to have been filled with gas, and on that basis the original volume of reservoir gas in West Atlanta field was calculated to have been about 9,000,000 bbl., equivalent to 14.9 billion cubic feet of gas at atmospheric pressure and 60° F.

The upper portion of the oil reservoir, above 7,984 ft. subsea, included 3,890 acre-ft. of pore spaces. Average interstitial-water saturation in this zone was calculated to have been 25.9 per cent, allowing 74.1 per cent of the pore space to have been filled originally with 22,362,000 bbl. of reservoir oil. The transition zone between 7,987 and 8,000 ft. below sea level included 4,152-acre-ft. of reservoir voids with an average water saturation of 41.8 per cent. It is calculated that this zone contained originally 18,733,000 bbl. of reservoir oil. The original reservoir oil of both zones was 41,095,000 bbl.

Properties of Reservoir Fluids

Reservoir oil.—Character of the oil in the Atlanta reservoir is known from two subsurface samples taken by Core Laboratories, Inc., in 1943, after reservoir pressure had declined from 3,821 to 3,480 psi. in West Atlanta, and to 3,410 psi. in East Atlanta field. The sample from East field had a viscosity of 0.35 cp. at reservoir pressure and temperature. By flash gas liberation to atmospheric pressure and temperature it yielded 1,031 cu. ft. of gas with a decrease in volume of 39.8 per cent. The viscosity of the sample from West field was 0.25 cp. at reservoir pressure and temperature; by flash liberation the oil yielded 1,058 cu. ft. of gas and decreased 38 per cent in volume. Based on the extrapolation of curves based on the analyses, it is estimated that the original reservoir oil contained 1,146 cu. ft. of solution gas per barrel of residual oil, and that the liberation of this gas to atmospheric pressure at 60° F. resulted in a shrinkage of specific volume from 1.695 to 1.0. Assuming that the average specific gravity of the solution gas was 0.8 (air = 1.0) the specific gravity of reservoir oil was calculated to have been about 0.60 (water = 1.0). The 41,095,000 bbl. of oil originally in the reservoir of Atlantic field was calculated to represent 24,245,000 bbl. of stock-tank oil.

Reservoir gas.—Little definite information is available regarding the composition of Atlanta reservoir gases at different pressures. The composition of produced gases varies widely depending upon the temperature and pressure at which the gas separated from the oil. The percentage of hydrogen sulfide in the gas from Atlanta field increases from a trace at 2,400 psi. to about 2 per cent in the gas liberated from oil at atmospheric pressure.

Summary of Reservoir Data

Pertinent data for both oil and gas reservoirs is summarized in Table 1.

Production

The oil, gas, and water-production histories of Atlanta field are shown graphically in Fig. 4. The area under curve A represents monthly production of stock-tank oil and the volume which this oil occupied in the reservoir immediately before production is shown as the area under curve B. The volume of free (or liberated gas) produced with the oil is shown as the area between curves B and C. Monthly water production is shown as the area between curves C and D, and the net volume of water returned to the reservoir during 1946 and 1947 is shown as the area between curves D and E. The total monthly fluid withdrawals from the reservoir (gross) is the area under curve D; net withdrawals, the area under curve E.

Since March 1, 1939, the allowable oil production per well has been regulated by the Arkansas Oil and Gas Commission. As shown by curve F in Fig. 4, the maximum allowable per well ranged between 100 and 200 bbl. daily. Oil production from wells with high water-oil and high gas-oil ratios was further restricted in proportion to the reservoir voidage by the water and excess gas produced.

Oil operators in Atlantic field have several problems in connection with the production of oil from the Smackover limestone. Listed in the order of their importance they are:

1. Exclusion of water from oil-producing wells.

TABLE 1—RESERVOIR DATA, SMACKOVER LIMESTONE, ATLANTA OIL FIELD

Oil Reservoir	
Total productive area, acres	4,172
Total volume of oil reservoir rock, acre-ft.	53,171
Weighted average porosity of reservoir rock, per cent	15.1
Average permeability of main body of oil reservoir, md.	1,090
Average interstitial water content of main body of oil reservoir, per cent	25.9
Volume of reservoir oil originally in place, bbl.	41,095,000
Formation volume factor (by differential data)	1.695
Volume of original reservoir oil at standard pressure and temperature, bbl.	24,245,000
Average stock-tank oil per acre-ft., bbl.	456
Gas in solution in reservoir oil per barrel of stock-tank oil (differential liberation), cu. ft.	1,146
Average viscosity of reservoir oil, cp.	0.35
Specific gravity of reservoir oil (water = 1)	0.60
Calculated interfacial tension between oil and brine, dynes per cm.	16.4
Gas Reservoir (West Atlanta)	
Total productive area, acres	930
Total volume of effective gas-saturated reservoir rock, acre-ft.	18,638
Average porosity of gas reservoir rock, per cent	15.96
Average permeability gas reservoir rock, md.	1,147.0
Calculated average saturation of gas reservoir with reservoir oil, per cent	4.0
Interstitial water saturation of gas reservoir rock, per cent	25.0
Calculated original volume of reservoir gas, bbl.	8,976,800
Volume of free reservoir gas at standard pressure and temperature, M.c.f.	14,926,000

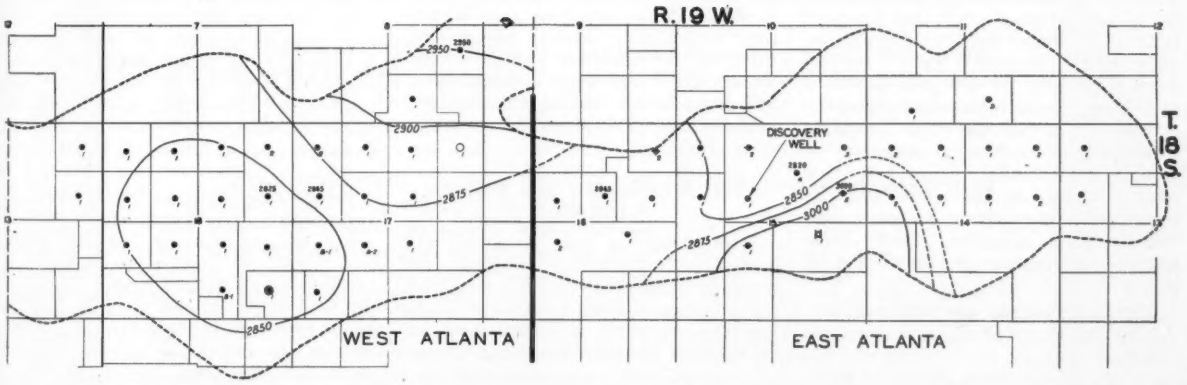

Fig. 5—Isobaric map (January 1, 1947). Estimated reservoir pressure at datum (7,900 ft. below sea level); weighted average = 2,842 psi.; arithmetical mean = 2,887 psi.

2. Removing paraffin from tubing, casing, and flow lines.
3. Excluding excess gas from wells.
4. Removing salt deposited in tubing.

Exclusion of water.—Water appearing in oil-producing wells is either formation water that replaces produced oil as a result of pressure differentials established during the production process, or is extraneous water that enters the well through leaking casing or casing seat.

Because of the wide range in permeability, formation water below the oil does not advance uniformly through the reservoir but cones or fingers around the wells. Plastics have been used in three wells in an attempt to plug off water-saturated zones, and in seven wells perforations opposite water-saturated zones were cemented off and the casing was reperforated above. Because of the comparatively high vertical permeability these plug-back operations were only temporarily successful. In a few wells, the percentage of water produced with oil decreased following a decrease in the rate of daily oil production. The possibility that a water-saturated zone was underlain by oil-productive sands of low water saturation, encouraged one operator to plug off the upper zone and to reperforate the casing below, but the test was inconclusive. In most wells water production increased uniformly and rapidly after the well was placed on the pump. Where the water production exceeded 95 per cent of the total liquid produced, the wells could not be operated economically and were abandoned.

Corrosion of casing by hydrogen sulfide gas gave considerable trouble in nearby Magnolia field and has caused leaks in Atlanta field which permitted extraneous water to enter the wells. Inert fluids left in the annulus as a protective measure against corrosion have not proved wholly effective in Atlanta field.

Removal of paraffin.—Paraffin which congeals in tubing and flow lines has proved troublesome on many wells in Atlanta field. Usually paraffin is deposited in wells that produce little or no water with the oil, and its deposition becomes more serious when the rate of oil production is restricted. Paraffin in the tubing is removed periodically by chemical treatment or mechanical scrapers. In wells where tubing is not set on a packer, steam or hot water was injected into the casing to melt and displace the paraffin. Flow lines usually were cleaned by blowing with steam.

Excluding excess gas from wells.—To prevent waste of gas and conserve reservoir energy it is desirable to maintain gas-oil ratios as low as practical. Because of gas liberation accompanying decline in reservoir pressure in Atlanta field, however, the gas-oil ratio of several wells increased greatly. Acid treatments were used with limited success to increase the permeability of the reservoir rock and to lower temporarily the produced gas-oil ratio. In some wells perforations opposite upper zones were cemented off, and the casing reperforated at a lower level to reduce the volume of gas entering the well with oil. Wherever the casing was set above the gas sand a liner was set and cemented through the gas sand. These methods, however, were not entirely successful and many wells in Atlanta field continued to produce with high gas-oil ratios.

Removing deposited salt from tubing.—In one well in West field, which produced considerable free gas and traces of water with the oil, difficulty was experienced with the tubing becoming plugged with salt crystals. Five months after the well was completed, the rate of oil flow from the well began to decrease rapidly and within a few days the well stopped flowing. When pulled, 21 joints of tubing were found to be plugged with salt at a depth of approximately 5,900 ft. below the surface. The casing was reperforated with five shots at depths between 8,294 and 8,295 ft. opposite former perforations; cleaned tubing was rerun, and the well flowed normally again for about 4 months. In October 1946 flow ceased again, and 21 joints of tubing at approximately 7,300 ft. were found to be plugged with salt crystals. The crystals contained 99.65 per cent sodium chloride, 0.15 per cent calcium chloride, and 0.15 per cent calcium bicarbonate.

It seemed probable that some of the brine produced with the oil was being evaporated by the expansion of gas in the flow string to cause deposition of the salt. As a remedial measure tubing was rerun without a packer and with the aid of a horizontal lubricator 5 to 8 bbl. of fresh water was injected daily into the annulus between tubing and casing and was produced through the tubing with the reservoir fluids. An analysis of produced water showed that formation water was diluted about one-third by the injected water; enough apparently to prevent crystallization of salt, because during the next 10 months no difficulty was experienced with plugging.

Fluid Withdrawals and Pressure History

Regulations of the Arkansas Oil and Gas Commission provide for monthly reports of oil, gas, and water production from individual wells, and these reports were the basis of production studies. Many additional production tests were made by commission and Bureau of Mines engineers. Since September 1940, shut-in bottom-hole-pressure tests have been made on representative wells at intervals of 3 or 4 months. Based upon these data, isobaric, water-production, and gas-oil-ratio maps were prepared and studied to interpret pressure changes and the movement of fluids in the reservoir.

The initial reservoir pressure in the discovery well, Tide Water and Seaboard 1 J. T. Beene, SE NW 15-18s-19w, was 3,821 psig. Twelve months later bottom-hole pressure in the well diagonally offsetting it to the northwest was 3,810 psi., indicating very little drop in reservoir pressure during this initial period when 167,000 bbl. of reservoir fluid was produced.

By January 1941, 16 oil wells and 2 dry holes had been completed in two separated areas in the eastern part of Atlanta field. In these areas reservoir pressure, as indicated by shut-in bottom-hole pressure tests, had declined from 3,821 to 3,700 psi. Total reservoir fluid withdrawals were highest in the neighborhood of the discovery well.

The tested initial gas-oil ratio of the discovery well was 1,608 cu. ft. per barrel as compared with an estimated solution ratio of 1,146 cu. ft. per barrel obtained by differential gas-liberation of a reservoir sample at 216° F. The next few wells completed produced gas in volumes approaching the solution gas-oil ratio. By January 1941, three wells in East field were producing gas at ratios appreciably above the solution ratio. In October 1940, maximum allowable oil production per well was decreased from 200 to 180 bbl. daily. Nevertheless, gas-oil ratios of the most westerly wells in East field continued to increase and in July 1941 the limiting gas-oil ratio for maximum oil allowables was raised from 2,000 to 3,000 cu. ft. per barrel; approximately three times the solution gas-oil ratio.

Nearly all wells in East field had been completed by May 1942. Reservoir pressures were higher in the western part of the field where total fluid withdrawals per acre-foot of reservoir voids were least.

By January 1943, the oil-water contact in the vicinity of wells along the south edge of the field had risen approximately 10 ft. West Atlanta field was discovered in July 1943, but total oil production from the two fields increased very little until early in 1944.

By November 1944, rates of gas and water production from wells along the south edge of the field had increased greatly and 13 wells in East field, and 5 wells in West field were producing gas at ratios above the solution gas-oil ratio. The highest gas-oil ratios were recorded on wells at the west end of East field in front of edge water advancing from the south. The reservoir pres-

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sure was lowest in East field, away from areas into which edge water was advancing, and highest in recently completed wells along the north edge of East field. As a result of large gas and water withdrawals from the reservoir, the bottom-hole pressure along the south edge of West field in November 1944 had declined 240 psi. in the preceding 16½ months.

Early in 1945 the maximum daily oil allowable per well was decreased to 100 bbl. daily, but after a temporary drop, gas and water production continued to increase. By December 1945, pressure in West field had declined so that with the exception of some low-pressure water-free areas in the center of the field, bottom-hole pressures were fairly uniform.

Water began to advance into wells along the north edge of the field during 1945 and by January 1946, six wells in that area were producing more than 2 per cent of water with the oil. The volumes of water produced with oil increased rapidly during 1946 and by January 1, 1947, only 10 of the older wells were producing water-free oil. Two recently completed wells along the north edge of West field also were water free.

Reflecting the effect of advancing edge water the volume of fluid produced per pound per square inch of reservoir pressure decline increased markedly and was approximately 2,100 bbl. from the entire field in 1946 as compared with about 1,470 bbl. in 1945.

During the first 6 months of 1947 water continued to move into the reservoir along the south edge of the field and production from one well was discontinued after remedial work failed to reduce water production. Reservoir pressure in some areas of East field was raised slightly by water injected into the disposal well along the south edge of the field. Fig. 5 shows reservoir pressures in Atlanta field as of January 1, 1947. Recently completed wells along the north edge of the field were water-free and these wells produced gas and oil at ratios close to the solution gas-oil ratio. In June 1947, several structurally high wells in West field still were producing much free gas with the oil.

Water Injection

Purpose.—Success of pressure maintenance in Midway pool and the beneficial results obtained by injecting salt water into flank wells in Magnolia field, Columbia County, Arkansas, encouraged operators to consider water injection in the Atlanta reservoir. As the pressure-production behavior of Atlanta field was similar to that of Midway field before water injection started, comparable, beneficial results from water injection in Atlanta field might be expected. Injection of produced salt water would

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When you need steam hose that's lightweight, flexible, rugged and SAFE, think of BWH Concord #10. It's your best bet . . . the safest we've ever made!

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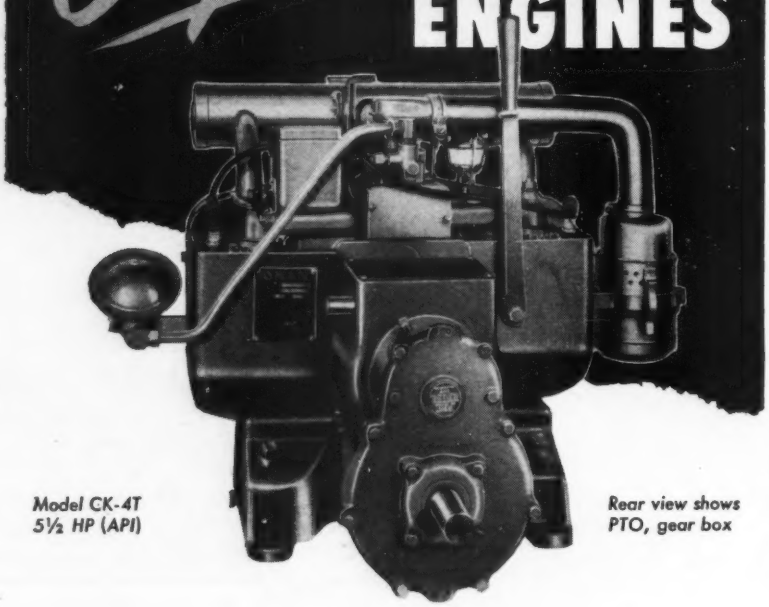

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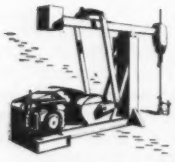

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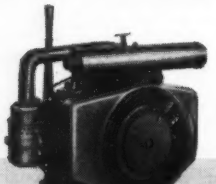

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serve the dual purpose of brine disposal and reducing the rate of pressure decline.

Injection well.—Tide Water Associated Oil Co. and Seaboard Oil Co., of Delaware, largest operators in Atlanta field, acquired a dry hole drilled on the Talley lease in N½ SE 15-18s-19w, for water injection. When the well was completed in 1940 it produced water and a show of oil from porous zones between 8,214 and 8,220 ft. below the surface.

After reconditioning regular water-injection into 1 Talley was begun August 25, 1946, and to July 1, 1947, approximately 521,000 bbl. of fresh water and 277,000 bbl. of salt water had been injected into the Smackover limestone reservoir.

Results of water injection.—First noticeable effect of water injection was to increase bottom-hole pressure in the temporary abandoned 5 J. T. Beene, from 2,865 psi. in August to 3,000 psi. in December 1946. By April 1946, bottom-hole pressures over most of East field had increased slightly. Pressure measurements made in July 1947, after water-injection rates had been reduced from 3,200 to 1,200 bbl. daily, showed lower average pressures than in April.

Recommended changes in water-injection program.—The writer thinks that most beneficial results in additional oil recovery could be obtained by injecting substantial quantities of water along the edges of the field adjacent to low-pressure areas not under the immediate influence of the natural water drive.

Based upon changes in the viscosity of the reservoir oil with pressure upon difficulties experienced in keeping low gas-oil-ratio wells flowing, and to prevent irregular water encroachment and bypassing of oil, it would seem desirable to stabilize the reservoir pressure as high as practical. To maintain reservoir pressure the total water entering the reservoir, both naturally and by injection, must balance the total fluid withdrawals. Total fluid withdrawals for the first 6 months of 1947 averaged about 348,000 bbl. per month, whereas natural water entry during the same period averaged only 151,000 bbl. per month. To maintain reservoir pressure at these withdrawal rates would require the injection of an additional 197,000 bbl. of water monthly to replace the produced fluids.

Acknowledgments

The petroleum-engineering study of Atlanta field, was conducted by the Bureau of Mines in cooperation with the Arkansas Oil and Gas Commission. The writer gratefully acknowledges the cooperation and assistance of O. C. Bailey, chairman; Lester Danforth, director; Lloyd Jordan, senior engineer; and Donald MacKay, senior geologist. Grateful acknowledgment is made of the cooperation of all the operating companies in the field and of the help and assistance provided by their engineers and production men in the field.

QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

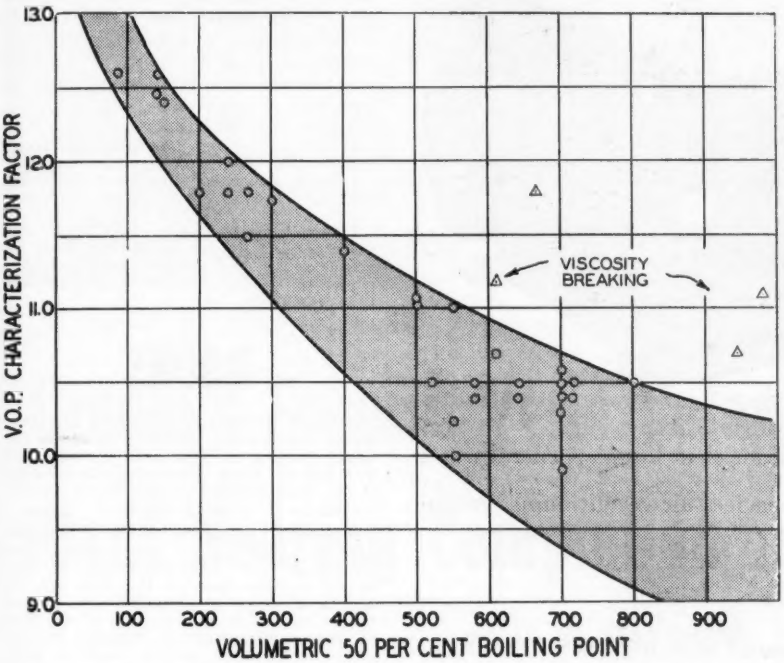

Fig. 1—Characterization factors of cracked materials as a function of A.P.I. gravity

Characterization Factor Of Cracked Stocks

We have difficulty in selecting the U.O.P. factor of cracked stocks. Have you information for us?—J. F. N.

Characterization (U.O.P.) factor is substantially constant for most crude oils regardless of the boiling range (or gravity) of material considered. This is not true for cracked materials. It ranges downward from about 13 for the lowest-boiling stocks to even 9.5 for the highest-boiling residues, somewhat as indicated in Fig. 1. The extent or degree of cracking vitally affects the characterization factor of cracked stocks and hence only a range can be indicated. Note in Fig. 1 that the factors for stocks that have only been viscosity broken (triangle points) are high. Only scant information is available. Most of the points shown in Fig. 1 were taken from the following references:

1. Characterization Factor, The Oil and Gas Journal, June 24, 1948, p. 325.
2. Distillation Curves of Cracked Residues, The Oil and Gas Journal, April 29, 1948, p. 155.
3. Nelson, W. L., Petroleum Refinery Engineering, 2nd Ed., Fig. 20, McGraw-Hill Book Co., New York, 1941.

Conductivity of Tube Deposits

We are having quite a discussion among ourselves as to the proper values of thermal conductivity of pipe still coke and are wondering if you can add anything to the discussion in the Second Edition of your Petroleum Refinery Engineering.—J. G. A.

Although cracking-still coke usually consists of mixtures of well-known materials such as carbon, coked asphaltic material, iron sulfide, and sodium chloride, the conductivity of the deposit probably depends more on its density than on the conductivities of the component materials. This is of little direct value because no systematic study of density appears to be available. Nevertheless, refinery operators know that most pipe-still coke is highly dense, that there is seldom any indication of a porous structure. Cracking-coil coke should not be confused with manufactured petroleum coke which is often porous.

Table 1 indicates scattered information on the conductivity of some coke-like materials. The carbonaceous materials, iron sulfide and salt, shown in the center of Table 1, all have conductivities between 2 and 4.1. Lighter carbon-rich materials, such as oils, asphalt, lampblack, and charcoal, have low conductivities, and the highly dense crystalline carbons (graphite and diamond) have very high thermal conductivities. It would appear that a conductivity of 3.25 or possibly 4 would be a satisfactory value for the computation of tube-wall temperatures in cracking-still coils.

On the Questions on Technology page of the April 19, 1947, issue of The Oil and Gas Journal, an equation of the temperature rise (in the tube wall) as a function of the heat-absorption rate per square foot of projected area "q," and the thickness of the coke "t," is presented:

$$\Delta T = \frac{q}{10}(0.21 + t)$$

This is based on a thermal conductivity of 3.0. Somewhat similar infor-

TABLE 1—THERMAL CONDUCTIVITIES OF SOME COKE-LIKE MATERIALS

	Apparent density, lb. per cu. ft.	Temp., °F.	Conductivity, B.t.u.-ft. per sq.ft.-hr.-°F.	Reference
Consolidated:				
Heavy oil	62.4	0-800	0.07-0.09	4
Paraffin wax	55	32-M.P.	0.133	4
Asphalt roofing, felt	55	68-100	0.058	2
Asphalt	*65	32-M.P.	0.097	4
Asphalt road			0.425	4
Graphite powder, compressed	30	104	0.104	1
Carbon, gas	*117	32-212	2.0	1
Carbon, amorphous			2.46	4
Carbon (Karbate)	94-110		3.0	
Coke, petroleum	56-69*	212	3.4	1
Coke, petroleum	56-69*	932	2.9	1
Coke, cracking coil			3.25	4
Iron sulfide	268-213		4.1	4
Rock salt	136		3.66	2
Graphite (Karbate)	105-117		85.0	
Graphite, dense	*140.5	68	50-75	1
Graphite, brick	*140.5	572-1292	58	3
Diamond	219.7		75	4
Loose:				
Lampblack	10	104	0.038	1
Charcoal, flakes	11.9-15	176	0.043-0.051	1
Charcoal, 6 mesh	15.2	80	0.031	1
Coke, powdered		0-100	0.11	1

*Estimated from different sources.

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Fig. 3769

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mation is given in Petroleum Refinery Engineering (McGraw-Hill Book Co., New York) but based on a conductivity of only 0.5. The low value was used because little information was available (15 years ago) and probably to obtain a large and impressive temperature in the tube wall.

All such computations are empirical and should be checked against particular plant operations in any way possible. Even with plant information it is not possible to know whether the conductivity is in error or whether the allowed tube-wall temperature is in error.

References

1. Perry, Chemical Engineers Handbook, McGraw-Hill Book Co., Inc., New York.
2. Kent, Mechanical Engineers Handbook, 10th Ed., John Wiley & Sons, Inc., New York.
3. Chemistry & Physics Handbook, 29th Ed., Chemical Rubber Publishing Co.
4. Nelson, W. L., Petroleum Refinery Engineering, 2nd Ed., McGraw-Hill Book Co., Inc., New York.

BOOKS

AUTOMOTIVE ANTIFREEZES. By Donald B. Brooks and Ronald E. Streets. National Bureau of Standards Circular 474. For sale by Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 16 pp. 15 cents.

Practical information on the essential properties and proper use of automotive antifreezes and cooling systems is presented in this booklet. Included are the results of years of extensive tests at the bureau as well as a summation of the work of other investigators. In addition to simulated and actual service tests of antifreezes, basic investigations of the physical and chemical properties of antifreeze compounds currently used in cooling systems were made. Answers to many questions are clearly given in the treatise.

CHEMICAL ENGINEERING CATALOG. Published by Reinhold Publishing Corp., 330 West 42nd Street, New York. 1,767 pp.

This annual work was inaugurated in 1915 by the American Institute of Chemical Engineers to provide a collected source of condensed and standard data about equipment, machinery, raw materials, heavy and fine chemicals, and laboratory supplies used in the industries employing chemical processes of manufacture with classified indices of such equipment and materials, carefully crossreferenced. It also provides a technical and scientific books section, cataloging and describing briefly a selected list of books on chemical and related subjects.

THE MANAGEMENT GUIDE. Published by Standard Oil Co. of California, 225 Bush Street, San Francisco. 100 pp.

Pointing up the ever-increasing emphasis being given by American business to management organization, this chart-illustrated book describes the use of management guides as aids in performing corporate functions. Prepared by Standard's widely known department on organization, the book is based on experience gained by the company in the last 12 years in preparing management guides for its departments and subsidiaries. Among the topics covered are the need and use of job-description forms, the delegation of responsibility and authority, pointers on how to prepare management guides, and their proper use. The book will be distributed free to colleges of business administration and other institutions offering training in business leadership.

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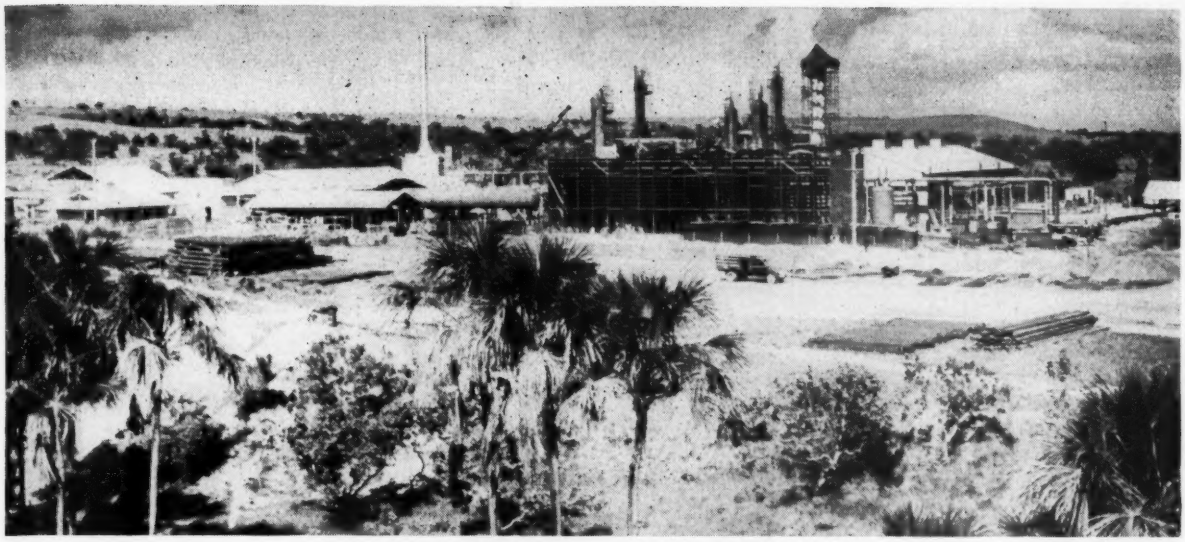


Over-all view of new $6,000,000 Mulata field processing plant—one of most modern in South America or elsewhere

Creole's Second Venezuelan Multipurpose Plant Nearing Completion in Mulata Field

by D. H. Stormont

ANOTHER step toward more efficient utilization of natural gas in Eastern Venezuela soon will be realized upon completion of Creole Petroleum Corp.'s new pressure-maintenance and crude-oil stabilization and desalting plant in Mulata field. This will be the second such new installation by Creole. The company recently also put into operation a similar plant in the nearby Jusepin field *(see The Oil and Gas Journal, January 13, 1949, pages 60-65)*. The total cost of the Mulata plant is estimated to be in the order of $6,000,000.

The Mulata installation will process some 60,000,000 cu. ft. daily from the field's 233 oil wells. About 20,000,000 cu. ft. daily will be compressed to 2,200 psi. and made available for pressure-maintenance operations.

Another feature of the new Mulata plant is the combination crude-desalting and stabilization unit, designed for a charging rate of 20,190 bbl. per day of 33.6°-A.P.I.-gravity crude oil. If this volume were put through a normal separation it would be reduced to about 19,900 bbl. of stock-tank oil of 53.1° gravity. However, through stabilization and absorption of the butanes-plus fractions from the natural gas, some 21,520 bbl. of 35.7°, 10.5 psi. vapor pressure stabilized crude will be discharged from the plant. Thus the stabilization process will result in a volume gain of approximately 1,620 bbl. and a gravity increase of more than 2° A.P.I. In addition, the desalting facilities incorporated in the plant will result in a reduction of the salt content of the crude oil from about 120 lb. to 15 lb. per 1,000 bbl.

Among other features of the Mulata plant will be the extensive use of 125 psi. dry gas as power for turbine-driven pumping facilities. These turbo-pumps, ranging from 50 to 90 hp., will be used throughout the absorption-oil cycle. In addition a 30-hp. turbine will be used as a standby for driving the boiler-feed pumps, and a 100-hp. turbo-pump will be employed in the fire-water circuit. The latter will operate on 200-psi. steam.

A direct-fired heater will be used to provide reheat for operating the lean-oil still and as a heating medium for the gasoline stabilizer, turbine gas heater, and lean-oil reclaimer. Specifications on this heater rate it capable of heating 367,000 lb. of absorption oil per hour from an inlet temperature of 425° to 520° F. About 1,330 sq. ft. of radiant and 1,390 sq. ft. of convection heating area are to be provided by 42 radiant tubes and 44 convection tubes (6 in. by 20 ft., mounted on 10-in. centers). The heater will operate at an inlet pressure of about 150 psi. and discharge at 125 psi. Draft will be provided by an 85-ft. stack.

Four-Purpose Plant

Briefly described, the new Creole plant will consist of (1) crude-stabilizing facilities, (2) an electrical crude-desalting unit, (3) absorption and gasoline stabilizing facilities, and (4) a compression plant for increasing the pressure of the residue gas to 2,200 psi. for return to the field. How the gas and crude will flow through this multipurpose plant is shown on the accompanying flow diagram. Approximate temperatures and pressures to be employed at various key points in the processes are given in Table 1.

Crude Stabilization and Desalting

Crude-oil production from the seven flow stations in Mulata field, currently about 22,000 bbl. daily, will flow to a 60 by 8-ft. horizontal surge drum where it will be flashed at about 75 psi. The raw crude then passes to the crude stripper through two primary and two secondary heat exchangers, countercurrent to the stabilized crude. In the stripping tower, a six-tray, 72 and 102-in. diameter vessel, the crude will be steam-stripped at 75 psi. pressure and 300° F. The

TABLE 1—TEMPERATURES AND PRESSURES TO BE USED IN MULATA PLANT

Vessel or stream—	Temp. (°F.)	Pressure (psi.)
Raw crude surge drum	100	75
Crude to stripper	230-240	75
Crude from stripper	300	75
Crude to desalter	220-250	110-150
Crude from desalter	220-250	75
Stabilized crude to storage	110	30
Brine to disposal	150	0
Makeup water to desalter	180-210	125-150
Gas from crude stripper	265	75
Condensate and gas from stripper surge tank	100	75
Low-pressure gas to compressors (1 to 8)	100	25
Gas to high-pressure absorber	95	510
Lean oil to high-pressure absorber	95	510
Gas to injection lines	260	2,200
Gas to low-pressure absorber	100	125
Lean oil to low-pressure absorber	95	125
Gas to reabsorber	100	70
Lean oil to reabsorber	95	70
Fat oil from surge tank	110	70
Feed to lean-oil still	380	100
Overhead from lean-oil still	200	100
Bottoms from lean-oil stills	480	100
Charge to still reheater	425	150
Return from still reheater	520	125
Still reflux and stab. feed from crude surge tank	100	100
Feed to stabilizer	190	240
Overhead from stabilizer	120	235
Reflux to stabilizer	100	235
Bottoms from stabilizer	260	240
Feed to lean-oil reclaimer	460	2
Bottoms from lean-oil reclaimer	335	2
Lean-oil makeup from accumulator	170	0

This is another of the series of articles prepared by the Journal's District Editor D. H. Stormont following his trip through Eastern and Western Venezuela, visiting oil fields, pipe lines, and refinery operations

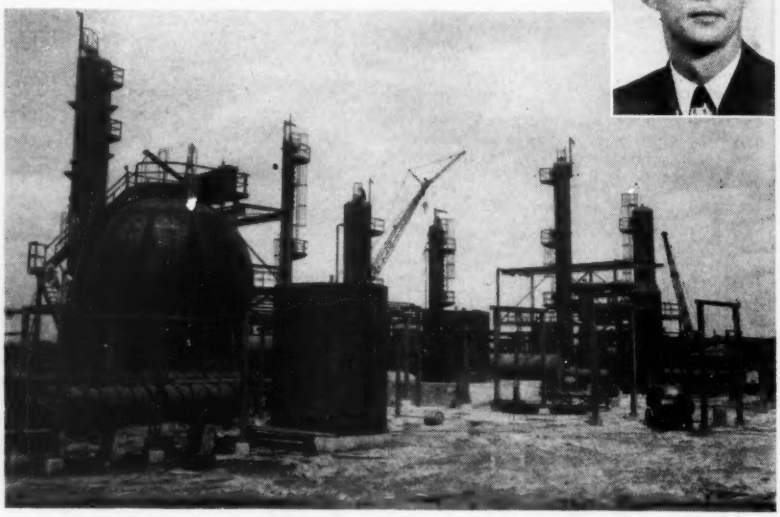


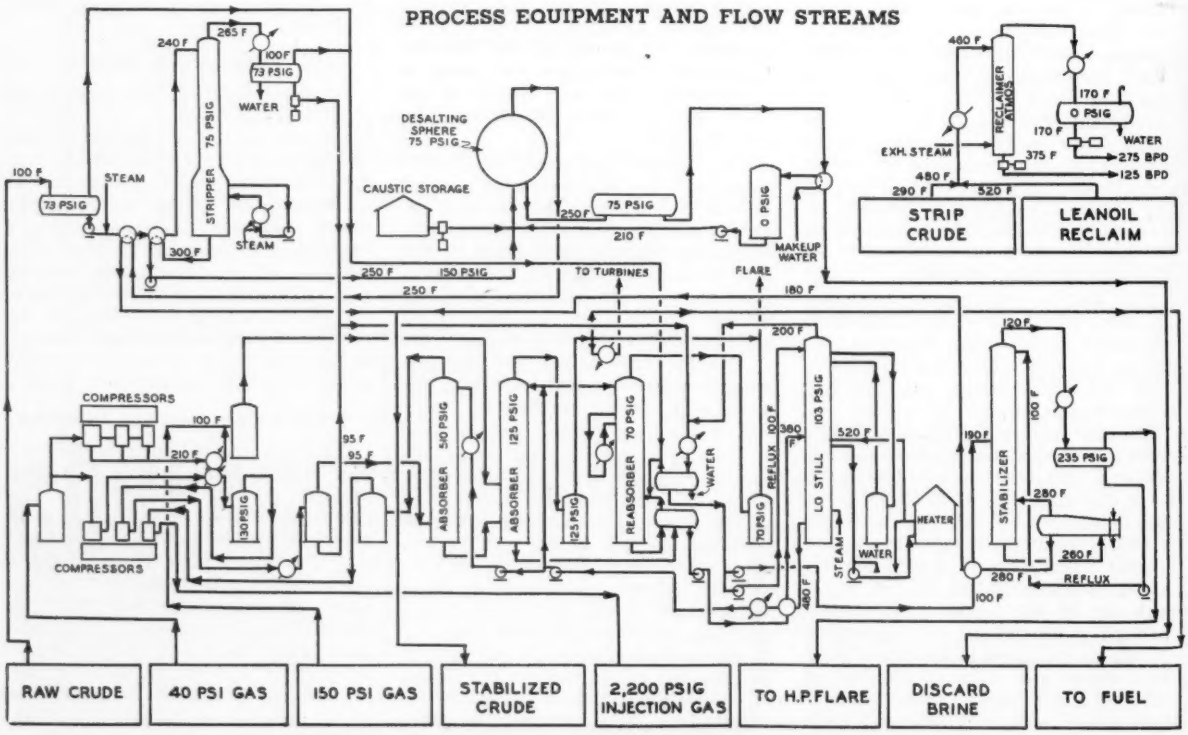
Photo of process area taken at mid-construction stage

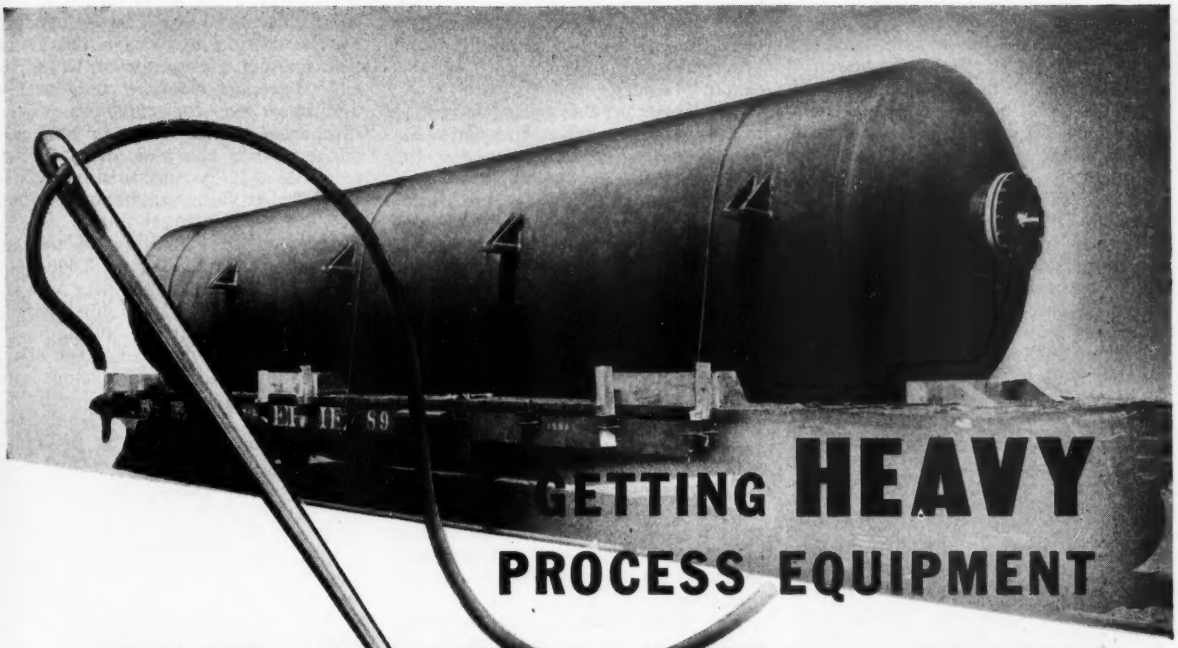
tower temperature is to be maintained by recirculating stripped crude from the bottom of the stripping section through a steam reboiler and back into the stripper.

Light hydrocarbon fractions released from the crude will join vapors from the surge tank and will be taken to a reabsorber for recovery of their gasoline fractions. The stabilized bottoms from the stripper are to be picked up by the desalting-unit feed pump and after being partially cooled by heat interchange with raw crude will be pumped to the desalting section. Temperature of the feed to the desalting unit will be automatically controlled between 220° and 250° F. as required.

Desalting will be accomplished in

PROCESS EQUIPMENT AND FLOW STREAMS





GETTING HEAVY PROCESS EQUIPMENT THROUGH THE EYE OF A NEEDLE

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BUBBLE
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a Petreco electrical unit, a 28-ft. sphere designed for a safe working pressure of 100 psi. Makeup water for the desalter will be preheated by heat exchange with brine discharged from the sphere. The brine, exiting at a temperature of about 150 F., will be pumped to an oil skim pond.

The desalted, stabilized crude oil from the sphere will pass through the stripping-section heat exchangers, through crude cooler, and run to storage. At a point before the stabilized crude is joined by stabilized gasoline fractions from the absorption unit, however, sufficient cooled crude will be removed to serve the absorption plant's lean-oil requirements of about 550 g.p.m. Composition of the stabilized product (crude oil and natural gasoline) is given in Table 2, as well as that of the 33.6°-gravity crude which will be charged to the plant.

TABLE 2—COMPOSITION OF CRUDE CHARGE AND FINISHED PRODUCT*

	Raw crude feed		Stabilized product	
Component—	Mol %	Bbl./ 24 hr.	Mol %	Bbl./ 24 hr.
Methane	1.78	76	....	.....
Ethane	1.45	89	....	.....
Propane	2.61	181	0.6	43
i-Butane	1.30	107	3.4	312
n-Butane	2.40	191	6.5	588
Isopentane	2.26	209	5.1	533
n-Pentane	1.84	168	3.6	368
Hexanes plus	86.34	19,169	80.8	19,678
Total	100.00	20,190	100.0	21,522

*Plant designed for charge of 33.6°-gravity raw crude, and discharging 35.7° crude after being blended with natural gasoline extracted in absorption unit and stabilized for removal of propane and lighter hydrocarbons.

Absorption Facilities

Natural gas available to the new Mulata plant amounts to about 30,700,000 cu. ft. of 40-psi. gas from the low-pressure separators and 30,000,000 cu. ft. of 150-psi. gas from the high-pressure separators. Facilities for compressing this gas will consist of seven 3-stage, 800-hp., gas-engine-driven compressors and one single-stage unit (all type 83-KVG-3). The three stages for the seven machines will be from 25 to 135 psi. in the low-pressure chamber, from 130 to 515 psi. in the second stage, and from 505 to 2,200 psi. in the high stage. The machine, equipped only for low-pressure compression, will take 25-psi. gas and compress it to 135 psi.

Absorption facilities will consist of two main absorbers, reabsorbers, lean-oil still, lean-oil reclaimer, and gasoline stabilizer. The low-pressure absorber, 90 in. in diameter, and containing 22 trays, will operate at 125 psi. It will handle 30,000,000 cu. ft. of wet gas direct from the 150-psi. separators, plus 9,200,000 cu. ft. of 40 psi. wet gas which has been compressed to 135 psi. in the one single-stage machine. The pumps, compressor, and absorber are suitable for operation at 150 psi. should it prove practical to increase the field separator pressure.

Dry gas from this absorber will go to fuel, turbine drive, and flare. Expected daily requirements for this 125-psi. gas are: compressor fuel, 1,300,000 cu. ft.; fuel for the direct-fired heater, 680,000 cu. ft.; boiler fuel, 820,000 cu. ft.; and for driving turbo-pumps, 10,000,000 cu. ft. The remainder temporarily will be run to flare until such time as it is needed in the pressure-maintenance program.

The second main absorber, a 48-in.-diameter tower containing 22 trays, will be operated at 510 psi. It will handle 21,500,000 cu. ft. of wet gas taken from the second stage of the seven three-stage compressors. Dry gas from this absorber is to be returned to the high-stage compression cylinders where the pressure will be raised to 2,200 psi. and the gas made available for the pressure-maintenance operations.

The 36-in.-diameter, 20-tray reabsorber is to operate at about 70 psi., handling the vent gases from the crude-oil flash tank, the uncondensed overhead from the crude stripper, recycle gases from the lean-oil still, and vapors flashed from the fat oil after it leaves the main absorbers. Dry gas from the reabsorber will be flared, while the fat oil will join the streams from the two main absorbers for charging to the lean- oil still.

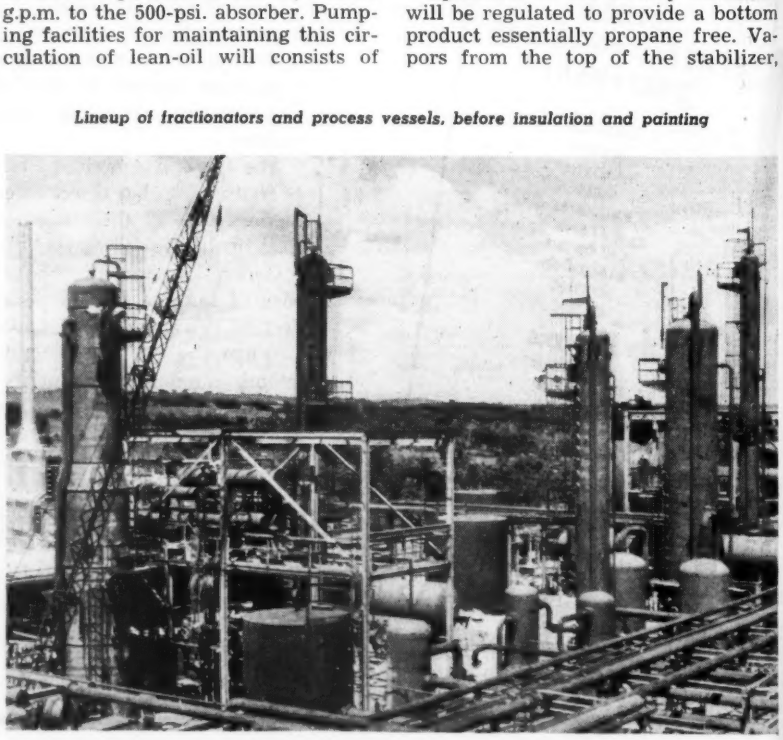
Some 555 g.p.m. of lean oil will be used to strip the wet gas of its gasoline fractions. This volume consists of 45 g.p.m. to the reabsorber, 420 g.p.m. to the low-pressure absorber, and 90 g.p.m. to the 500-psi. absorber. Pumping facilities for maintaining this circulation of lean-oil will consists of the following units: A 90-hp. gas turbine driving a two-stage (25 to 190 psi.) centrifugal pump of 620-g.p.m. capacity, and a 50-hp. gas turbine driving a six-stage (190 to 560-psi. discharge) booster pump of 100-g.p.m. capacity. For charging the fat oil to the still a 70-hp. gas turbine will be used to drive a single-stage (70 to 185 psi.) centrifugal pump of 210 g.p.m. capacity. All of the turbines are to be General Electric, 3,600-r.p.m. units operating on 125-psi. dry gas. The pumps are of Ingersoll-Rand design. Standby units for pumping the lean oil will be identical to the above.

The combined fat-oil streams after passing through preheaters will flow to the still feed tank. From there they will be picked up by the fat-oil pump and charged to the 84-in.-diameter, 19-tray lean-oil still. Heat for the operation of this tower is to be supplied by circulating still bottoms through the still reheater as explained above. Pumping facilities for charging the lean-oil to the reheater will consist of a 1,250-g.p.m., single-stage (100 to 175 psi.) pump direct driven by an 80-hp. gas turbine.

A portion of the lean-oil stream on its route back from the reheater will be taken to a 36-in.-diameter, 6-tray lean-oil reclaimer where it is joined by a stream of desalted crude used for lean-oil makeup. Overhead vapors from the towers will be pumped into the fat-oil stream and thus fed to the lean-oil still. Bottoms from the reclaimer are to be pumped into the stabilized crude stream, joining at a point just ahead of the crude coolers.

Operation of the 30-tray stabilizer will be regulated to provide a bottom product essentially propane free. Vapors from the top of the stabilizer,

Lineup of fractionators and process vessels, before insulation and painting



largely propane and lighters, will be taken to the boiler plant and burned as fuel. The stabilized bottoms are to be cooled and blended into the desalted crude downstream from the absorber lean-oil takeoff point. Normal temperatures and pressures expected to be employed in the tower's operation are shown in Table 1.

Other Plant Facilities

The cooling tower to be used will be a three-cell, induced-draft type as designed by Lilie-Hoffman. It will cool some 8,200 g.p.m. of water to 88° F. For pumping the water over the tower, three 5,000-g.p.m., vertical single-driven Byron-Jackson pumps will be installed, one acting as a standby. These will be driven by 200-hp., 1,150-r.p.m. electric motors. For circulating engine-jacket water to the compressors, two (one as a standby) 4,900-g.p.m. single-stage pumps driven by 150-hp. motors will be provided.

Two boilers (one spare) will provide 25,000 lb. per hour of saturated steam at 200 psi. These will be gas fired, of the water-tube type, with a total heating surface of about 4,250 sq. ft. They will be of Babcock & Wilcox design. Pumping equipment for supplying boiler feed water will consist of a 65-g.p.m., 8-stage (0 to 290 psi.) centrifugal pump. It will be driven by a 30-hp. motor with a 20-hp. gas turbine acting as a spare.

Heat exchangers and coolers throughout the plant will be installed at grade, with adequate space allowed in front of the equipment for using mobile cranes for removing body covers, channels, and tube bundles. Condensers are to be mounted on an elevated platform, with the condensers being served by monorails.

Tankage being erected at the Mulata plant consist of a 5,000-bbl. cone-roof fresh-water storage tank, a 500-bbl. lean-oil storage tank, 250-bbl. boiler feed tank, and 500-bbl. caustic tank equipped with air spider. There also will be a 250-bbl. jacket-water surge tank.

Fire-Fighting Equipment

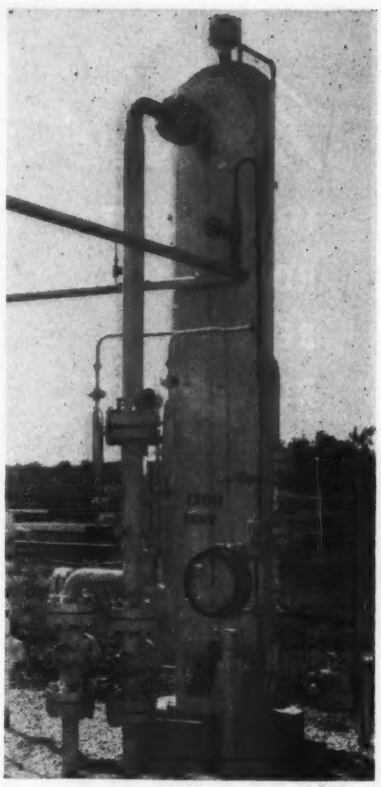
Careful attention has been paid to safety practices, including guard rails for the machinery and the like, and to fire-fighting equipment. For the latter, there is a water-supply header constructed as a loop pipe line around the processing area. Twelve fire hydrants are installed at strategic locations and connected to this system. At each fire hydrant there is a weatherproof box containing 50 ft. of 2½-in. fire hose and a water-spray nozzle. Portable fire-fighting equipment for the plant includes twelve Du-Gas extinguishers, twelve 2½-gal. foam-type extinguishers, two portable dry-foam generator units mounted on completely equipped portable carts, five 1-in. fog nozzles and five 50-ft. lengths of 1-in. water hose.

Buildings and Auxiliaries

The buildings at the Mulata plant are of modern design, and all are ventilated with filtered air under forced draft. The plant office, laboratory, and change room is 31 by 40 ft. in size. The compressors are housed in a 55 by 140-ft. building, the switch-gear house is 23 by 60 ft., the boiler canopy is 23 by 60 ft., and the gage board and centralized control panel also are housed in a 23 by 60-ft. building. Two separate sewer systems are provided, one for process drainage and the second a sanitary system. The equipment and processing areas are well equipped with hoists, davits, and trolley-beam conveyances for periodically examining, cleaning, and maintaining the equipment.

The Mulata plant is connected with the extensive electrical power system that Creole operates. This system interconnects its Jusepin plant, Quiriquire oil field and its Creole division headquarters and refinery at Caripito. A new 10,000-kva. power plant is installed adjacent to the Jusepin pressure-maintenance plant. At Mulata, the control of the many electric motors powering process pumps is centralized on a large "Cabinetrol" type motor control board.

Construction of the plant, which was started in the spring of 1948, is proceeding fairly well on schedule so that the plant probably will be in operation early this year. At that time pilot-model operations will be undertaken to determine the effectiveness of pressure maintenance.



This closeup view shows the hookup used on the gas-distillate test separators. For individual well tests, gas-distillate producers are put through a system similar to that for oil wells which undergo three-stage separation

2 of World's Largest Separation Stations

(Continued from page 69)

A battery of 300-lb., vertical test tanks with a small diameter (10 ft.) are available at each separator station. (Six at B.R.L.D. and four at Wilson.) Small-diameter tanks were purposely selected to insure accurate gaging. Approximately 70 psi. pressure is maintained on these tanks. After gaging, production is pumped back into the 150 psi. oil header from the tertiary separators.

To calibrate the positive-displacement meters and for special gas-oil-ratio tests, oil wells are flowed into the pressure test tanks. The test procedure is similar to that used for testing the gas-distillate wells as described above.

Safety Emphasized

Many safety features have been incorporated in the new separation layout. In order to minimize hazards from line breaks and fires, all flow lines are routed outside the absorption-plant area. In addition, they are uniformly laid in properly marked pipe lanes. All flow lines at the B.R.L.D. station enter at one point with plug valves on each line several hundred feet back from the separators. Also, the gas and oil lines from the Wilson station enter the plant by way of the B.R.L.D. station. Hence, the entire field can be shut off from the plant at a central point in an emergency.

Adequate safety valves have been installed on each separator and on all gas headers. At the Wilson station, a relief valve has been installed on the 150 psi. oil line. In the event the plug valve on this line is closed at the plant, the relief valve will divert oil into a 5,000-bbl. tank. Check valves have been installed on all flow lines near the separators at both stations.

All overhead light and power lines in the immediate vicinity of tanks and separators have been removed. Considerable pains have been taken to insure proper lighting at all points. All lighting fixtures are approved by Underwriters Laboratory for hazardous locations.

All separators have a minimum clearance of at least 250 ft. from any tankage. All open ditches around the

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separators have been eliminated with all drains connected into a closed drain system. Flow lines in the separation station areas are of pipe with a working pressure in excess of any well's flowing pressure.

Higher Operating Efficiency

Increased plant compressor-station efficiency has been obtained through the use of pressure-control regulators. Before the recent improvements, it was not possible to run the compressor station at full capacity. It was necessary to have one compressor idle to take care of sudden fluctuations in residue-gas demand in the high-presure systems. These fluctuations were normally caused by wells being opened or gas sales decreasing. Pressures in the plant were affected and over-all plant efficiency reduced.

To overcome these difficulties, pressure-control regulators have been installed at the B.R.L.D. station on the 1,750 and 1,250 psi. gas-distillate headers. These regulators maintain constant pressure on these two systems in the plant. They also control flow from the gas-distillate wells enabling the compressor station to run at capacity and the plant to operate more efficiently.

An oil-drain recovery system for the separators has been incorporated in the new layout. When a separator is taken out of service for any reason, the oil can be saved rather than be sent to a burning pit.

The central stations have made it possible to eliminate stock tank batteries on the individual leases. The three 20,000-bbl. storage tanks at the B.R.L.D. station do the same job that required 138 stock tanks and 48 gun barrels before. It is easy to see that a very substantial reduction in evaporation losses is realized by this one step.

Harry W. Elliott, Jr., superintendent for Abercrombie at Old Ocean, prepared the engineering report which was the basis of the work described in this article. Other supervisory personnel at Old Ocean include: W. J. Hagner, plant superintendent; C. E. Daly, drilling superintendent; R. H. Martin, construction superintendent; C. R. Burney, production superintendent; and F. A. Hunter, district engineer

Key personnel of the Abercrombie company are: Don Knowlton, president; Ben H. Williams, vice president and manager of operations; J. P. Roetzel, treasurer; F. J. Whitley, assistant to manager of operations; C. W. Shively, chief engineer; and Hillord Hinson, chief geologist. Max R. Lents, vice president and general manager until recently, has joined J. R. Butler Co., consulting firm, Houston.

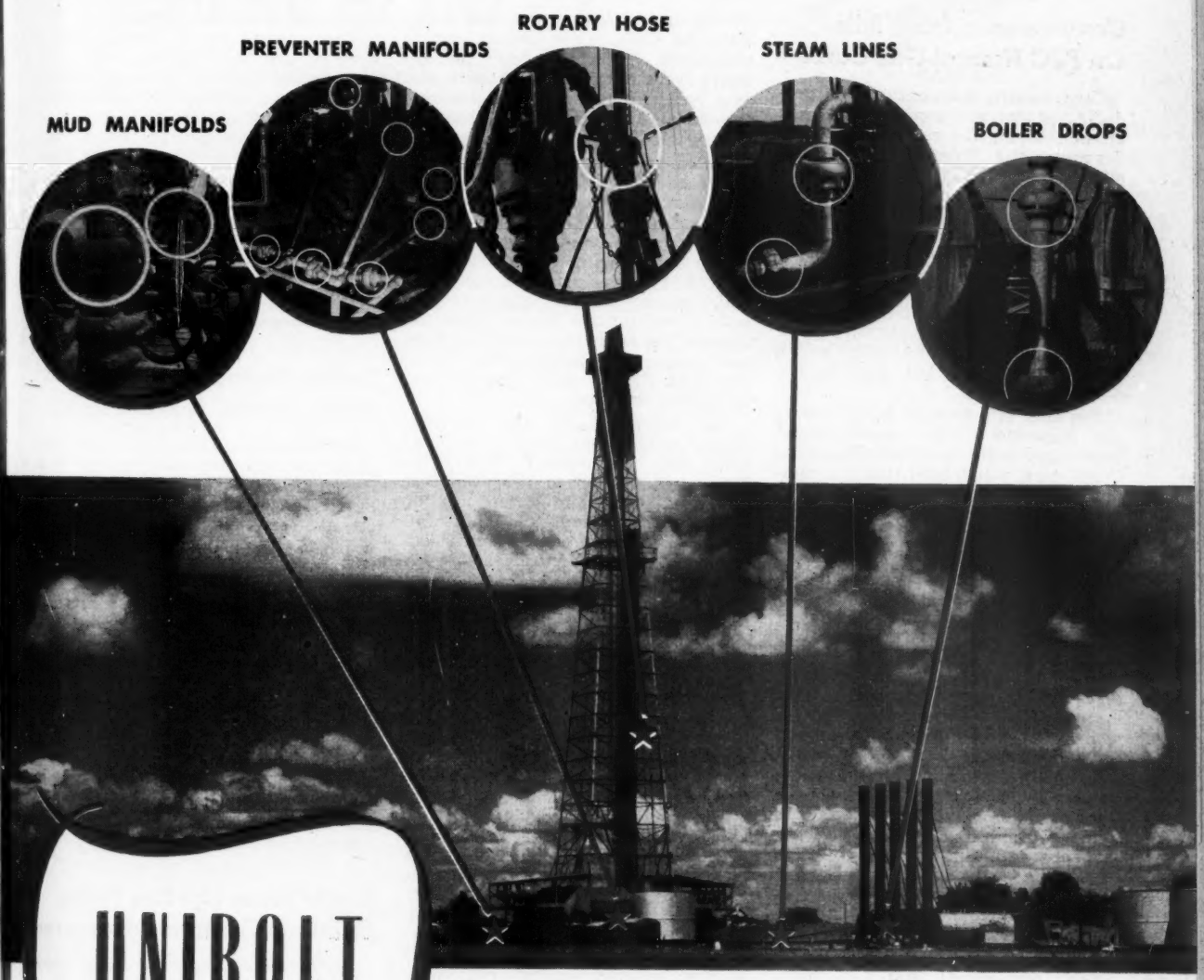
Reference

"Nation's Largest Voluntary Unit Formed on Texas Gulf Coast," Leigh S. McCaslin, Jr., The Oil and Gas Journal, September 16, 1948, pp. 84-86.

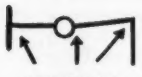
XUM

STRESS-FREE LINES LEAD TO

Economical Rig Maintenance

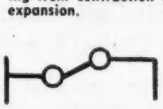


UNIBOLT *Flexi-Ball* JOINTS



STRESS HERE

Using only one Ball Joint does not properly eliminate stress resulting from contraction or expansion.



NO STRESS

Using two Ball Joints in series eliminates stress resulting from contraction or expansion.

The Flexi-Ball Joint, which provides for misalignment up to 38 degrees, depending on the size of the joint, is designed to relieve lines of stress resulting from expansion, vibration, or misalignment. It is a "natural" for flexible manifolds.

The proven UNIBOLT coupling principle is employed to join the component parts of this fitting. As a result, trouble due to galling and freezing of threads is entirely eliminated by the Flexi-Ball design. It is assembled by the simple process of tightening one bolt with an end wrench. Even after extended periods of service, the joint can be quickly dismantled by releasing the bolt.

This fitting may be used safely in any service, since it is made in steel only. Its sizes range from 1½" to 6" and test pressures to 6000 lbs., depending on size; 500 lbs. steam working pressure.

THORNHILL-CRAVER COMPANY

HOUSTON, TEXAS

NATURAL GAS

Congressmen Offer Bills On FPC Natural-Gas Curbs

Congressmen from natural-gas producing states are again making an attempt during the current session at depriving the Federal Power Commission of jurisdiction over production and gathering, and "arms length" sale of gas.

Bills similar to that effect have been introduced in the House of Representatives by John E. Lyle of Texas, and Oren Harris of Arkansas. They embody, in effect, production and gathering provisions of last session's much broader Moore-Rizley bill, which passed the House, but died in the Senate.

The bills' effect would be to reverse the Supreme Court's controversial 1947 ruling in the Interstate Pipe Line Corp., case, which held that the commission had authority to require the company to account for the production end of its supplier contracts.

The Harris bill, according to its author, would leave FPC jurisdiction "only on interstate trunk lines," except for their own controlled production and gathering facilities. The measure amends the Natural Gas Act of 1938 to specify that it is not to apply to transportation and sale of natural gas "between the well or wells where produced and the point of its delivery to or reception in the interstate transmission facilities of a natural-gas company. . ." and applies this exemption to "sale at arm's length to a natural-gas company" defining that term to mean a company able to engage in independent bargaining, and not affiliated with producers in such a way that there is "liable to be such absence of independent bargaining. . . ."

Both the Harris and Lyle bills were referred to the House interstate commerce committee, headed by Rep. Robert Crosser, of Ohio. No hearings have been scheduled, however.

Texas Gas Firm Seeks to Annul Restriction Order

Canadian River Gas Co. of Texas, has asked the U. S. Supreme Court to force a special three-judge federal District Court in that state to hear a suit filed by the company which would invalidate the Texas Railroad Commission orders which limit the firm's natural gas production in West Texas.

The company's petition for a writ of mandamus relates that the Texas Railroad Commission issued certain production limitation orders in 1935 which were fought in the courts, and as a result of this legal controversy, the commission was enjoined from enforcing the orders.

Canadian River's complaint states that the commission's orders and schedules had the effect of limiting the production from the company's wells to an amount below its marketing requirements in performing its obligation under existing contracts and commitments for gas purchases both in and outside Texas, below the amount the wells were and had been producing, and below capacity of Canadian River's transportation and marketing facilities.

The complaint to the Supreme Court states that the three-judge court for the western district of Texas has refused to hear the case and that Canadian River has no other remedy except to ask the Supreme Court to direct the Texas federal court to proceed to trial.

Tennessee Gas' Rate Revision Hearing Postponed

Two hearings concerning the "lawfulness" of rate schedule revisions proposed by Tennessee Gas Transmission Co., Houston, Tex., have been postponed by the Federal Power Commission to March 15.

The changes, previously suspended by FPC, would change the quality provision to provide that the quality of gas is to be determined at the temperatures and pressures in Tennessee's pipe lines, and would in effect put specific volumetric ceilings on Tennessee's obligations to supply its "entire requirement" customers.

The hearings were postponed on motions by Tennessee Gas, and three customer companies — Hope Natural Gas Co., East Tennessee Natural Gas Co., and Tennessee Natural Gas Lines, Inc.—which had objected to the proposed changes.

Industry Gets Gas Cut in January by Cities Service

In spite of the fact that average temperatures during the month of January this year were 4 degrees above 1948, Cities Service Gas Co. was forced to increase industrial curtailments during the first 24 days in January by more than 18,000 M.c.f. daily. Company records show that, due to the extremely inclement weather in its territories, domestic consumption jumped by more than 105,000 M.c.f. in January 1949 as compared to the comparable month of 1948.

That the intense cold weather affected deliveries is evident in one instance, the company reports. On January 29 a high of 787,000 M.c.f. was delivered, with storage facilities providing 119,000 M.c.f. through withdrawals. On the following day, system inputs climbed to an estimated 789,000 M.c.f. with storage withdrawals furnishing 114,000 M.c.f.

Typical temperatures along the company's system were —23° at Chanute, Kans., and —4° at Kansas City, Mo.

Natural Gasoline

Details Revealed on Sun's Starr County, Texas, Plant

HOUSTON.—Details of a gasoline plant and injection program for Sun field of Starr County were revealed by B. E. Warren of Sun Oil Co. at a recent Texas Railroad Commission hearing.

Warren, who is manager of Sun's gas-gasoline department, told the commission his company is constructing a gasoline plant in the field, designed to recover 80 per cent propane. Gas will ultimately be gathered from Sun, North Sun, Rincon, North Rincon, and Garcia fields. Design capacity of the plant is 20,000,000 cu. ft. per day.

Transcontinental Gas Pipe Line Corp. is scheduled to take the plant's residue by April 1951. Until that time, it will be stored in the C-1 sand reservoir of Sun field.

South Texas Cycling Plant Building Contracts Executed

HOUSTON.—Contracts have been executed for the construction of a cycling plant for the North Pettus and Burnell fields in Bee, Karnes, and Goliad counties of South Texas, according to testimony before the Texas Railroad Commission.

Stanolind Oil & Gas Co. will be the plant operator. Twenty operators in Burnell field and 22 in North Pettus have unitized their interests. Union Producing Co. is unit operator for the wells.

The new plant is being designed for 159,000,000 cu. ft. daily input. Recoveries will be 50 per cent propane, over 98 per cent pentanes and heavier. Estimated recovery is 40 bbl. per million cubic feet which will give the plant an initial production of about 6,500 bbl.

XUM

Cost-imating

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Insulation for Cold—2

Cork Covers for Fittings

RECOMMENDATIONS regarding the thickness of cork insulation were shown in Cost-imating No. 16 of February 3, 1949. Most of the material was taken from the excellent paper by F. C. Otto, Chem. Eng., May 1947, page 118. Costs were converted from early 1947 to 1946 costs by indexes of 113 for material, and 116 for labor. List prices are considered to be 100 per cent higher but the size of the order governs the discount (see Cost-imating No. 16). Tables 1, 2, and 3 were published in Cost-imating No. 16 of February 3, 1949. Special thickness designations are:

IWT—Ice Water Thickness
BT—Brine Thickness
STB—Special Thickness Brine

TABLE 4

Installation Costs of Pipe or Fitting Covers, Per Cent of Material Cost (1946)

	Below 15 ft.	Above 15 ft.
Inside—		
IWT thickness	50	62
BT thickness	44	56
STB thickness	34	44
Outside—		
IWT thickness	86	108
BT thickness	70	88
STB thickness	60	76

TABLE 5—APPROXIMATE COST (1946) OF BRINE THICKNESS* MOLDED COVERS FOR SCREWED FITTINGS ($ EACH)

	90° ells†			Tees		Crosses‡	Unions	Flanges	125-lb. valves§	
Pipe size (in.)	Std. 125-lb.	Std. 250-lb.	Long 125-lb.	Std. 125-lb.	Std. 250-lb.	Std. 125-lb.	Std. 125-lb.	all types	Globe or angle	Gate
¼	0.62	0.69	0.95	0.69	0.75	0.91	0.69	0.84	0.75	0.71
⅜	0.62	0.69	0.95	0.69	0.75	0.91	0.69	0.84	0.75	0.71
½	0.62	0.69	0.95	0.82	0.95	0.91	0.69	0.84	0.75	0.71
1	0.75	1.00	0.95	0.84	1.21	1.13	1.00	1.37	1.06	0.95
1¼	1.06	1.19	1.33	1.17	1.42	1.55	1.19	1.66	1.37	1.24
1½	1.19	1.70	1.53	1.46	1.88	1.95	1.70	2.19	1.57	1.64
2	1.42	2.06	1.90	1.70	2.39	2.26	2.06	2.23	2.34	2.61
2½	1.77	2.48	2.08	2.12	2.78	2.83	2.48	2.48	3.32	3.54
3	2.69	2.94	3.14	3.14	3.50	4.18	2.94	3.25	4.18	4.31
3½	3.16	3.52	3.69	3.56	4.33	4.75	3.52	3.62	5.90	5.96
4	3.45	4.18	4.06	4.33	5.44	5.79	4.18	3.85	5.90	5.96
5	4.40	5.66	6.52	5.36	7.18	7.14	...	4.86	7.27	7.40
6	5.90	6.05	7.39	7.16	8.42	9.55	...	5.67	9.08	9.10

*For Special Thickness Brine, STB, add 75-100 per cent of BT costs. For Ice Water Thickness, IWT, add 40-50 per cent of BT costs. †45° ells same cost in smaller sizes but slightly cheaper at a size of 3 in. and larger. ‡For long sweep crosses add 43 per cent. For 250-lb. crosses add 30 per cent. For ammonia crosses add 25 per cent. §Add 36 per cent for 250-lb. globe or angle valves. All 40 per cent for ammonia valves. Add 40 per cent for 250-lb. gate valves.

TABLE 6—COST (1946) OF MOLDED CORK COVERS FOR FLANGED FITTINGS ($ EACH)

	Brine Thickness, BT*	Special Thickness Brine, STB, and Brine Thickness, BT†					
			Crosses		Flanges		Globe and angle valves	
Pipe size (in.)	90° ells,‡ 125 lb., 250 lb. and ammonia	90° long radius ells, 125 lb. and 250 lb.	Tees, 125 lb., 250 lb. and ammonia	BT	STB	BT	STB	BT	STB
¼	2.17	2.17	2.48	3.30	5.50	0.84	1.66	2.92	4.57
⅜	2.17	2.17	2.48	3.30	5.50	0.84	1.66	2.92	4.57
½	2.17	2.17	2.48	3.30	5.50	0.84	1.66	2.92	4.57
¾	2.46	2.46	3.05	4.07	5.50	1.13	1.66	3.49	4.57
1	2.78	3.07	3.58	4.77	8.33	1.37	2.21	4.02	6.71
1¼	3.42	3.78	4.13	5.50	10.90	1.66	2.39	4.57	8.62
1½	4.53	5.00	5.66	7.54	10.90	2.19	2.39	6.10	8.62
2	4.81	5.30	6.19	8.25	12.45	2.24	3.18	6.63	9.76
2½	6.27	6.92	8.02	10.70	12.45	2.48	3.18	8.46	9.76
3	7.25	9.35	9.35	12.45	16.70	3.25	3.52	9.79	12.96
3½	8.13	14.07	12.08	16.10	19.20	3.62	4.31	12.50	14.80
4	9.46	14.07	12.08	16.10	19.20	3.62	5.10	12.50	14.80
5	9.76	14.90	14.07	18.75	.....	4.86	...	14.50	...
6	13.16	16.60	16.70	22.45	.....	5.67	...	17.10	...

*Add 30 per cent for STB or deduct 30 per cent for IWT. †Deduct 40 per cent for IWT. ‡45° ells same as 90° ells up to 3 in., larger sizes slightly cheaper.

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ENGINEERING *fundamentals*

Classification of Reservoir Materials

IN the determination of reservoir performance there are several groups of factors that play a dominant role. These are (1) the characteristics of the reservoir material, (2) the structural features of the reservoir, (3) the characteristics of the reservoir fluids, (4) the pressure and temperature of the reservoir, and (5) the operating conditions that are imposed upon the reservoir. The variables in some of these groups are understood better than those in others. For example, the characteristics of reservoir fluids have received much study and a large amount of the progress made in the understanding of reservoir behavior has been due to an elucidation of these characteristics.

Most of the variables within this particular group can be expressed quantitatively. On the other hand, one of the least understood of these groups of factors is the characteristics of reservoir materials. The present discussion will present some of the qualitative aspects of the variables that experience has indicated will enter into a complete delineation of the role of reservoir materials in reservoir performance.

Chemical and Physical Variables

The characteristics of reservoir materials are determined by both chemical and physical variables. Both the physical and chemical entities will be important from the standpoint of fluid distribution and fluid movement. Both will be important in the determination of the displacement properties of the reservoir material and of its capillary properties. The physical factors have probably received more discussion in the literature.

The classification of reservoir materials up to the present time has been descriptive. One may say that a reservoir is a limestone, a dolomite, or a sandstone. He may further subclassify it as a sandy lime, a dirty sand, a fine-grained sand, a calcareous dolomite, or as some similar combination of descriptive terms. One may even be more specific in the description by stating that a reservoir belongs to a certain geologic horizon, such as the Bartlesville sand or the Ellenburger lime, for example. Such classifications are used because it is recognized that qualitatively the type of reservoir material has something to do with the performance of the reservoir.

Type of Pore Structure

The classification of reservoirs is given a further descriptive significance by a statement concerning the type of pore structure. For this reason one might refer to an unconsolidated sand reservoir, to a well-cemented sandstone, to a fractured limestone, or to a sucrosic-type dolomite. Such descriptions are meant to convey a dependence of reservoir performance upon the pore geometry. It is generally recognized by petroleum engineers that there is such a dependence. We know very definitely that differences in geometry produce differences in the capillary pressure-saturation relationship and in the relative permeability-saturation relationship. Yet the manner of expressing this geometrical configuration to give a proper parameter for describing the variation quantitatively has not been found.

What is necessary, in effect, is a complete quantitative description of reservoir materials in terms of measurable engineering quantities. For example, porosity and permeability are such quantities. These are not enough, however, to make a complete definition of a given reservoir specimen. Some other properties which tie together porosity and permeability would be desirable. Properties which express a variation between different reservoir specimens on some other basis than porosity and permeability are yet more desirable.

In expressing a given pore geometry quantitatively several different types of measurements would be important. For instance, it would be desirable to record that particular property of the pore arrangement that determined the amount of connate water that it could hold. A second measurement of importance would be that property which gives the amount of water that might be present without affecting the amount of oil flow. This could be expressed, for example, as that property of the pore space which gave the amount oriented perpendicular to the direction of flow.

One of the measurements which might prove to be of importance in the classification of reservoir materials is the internal surface area. For example, in describing the flow of fluids through conduits of cross-section which are not circular, it is convenient in hydraulics to utilize the term "hydraulic radius." This term involves the wetted perimeter of the conduit and the cross-sectional area. Equivalent to the wetted perimeter in a porous body would be the wetted area. An expression of this term might have quantitative significance for flow purposes.

"Tortuosity"

Another property of porous materials which has been advanced as capable of giving some indication of the type of pore geometry is that termed "tortuosity." This is a quantity which is designed to represent the departure of the porous system from the equivalent of a straight bore capillary.

The ability to classify a given specimen of a reservoir material such as a core plug does not guarantee that a reservoir as a whole can be so classified. Coupled with the classification of the small core specimen itself is the problem of classifying an entire reservoir from a number of such small specimens taken from it. It is entirely possible that the hetergeneity of a reservoir might be such that no two samples taken would yield the same characterization. In other cases it might be sufficient to classify one or two or at the most several samples and be assured that the reservoir was classified therefrom. This problem is one of determining the technique of sampling a reservoir to completely define it. Some work along these lines has been published.

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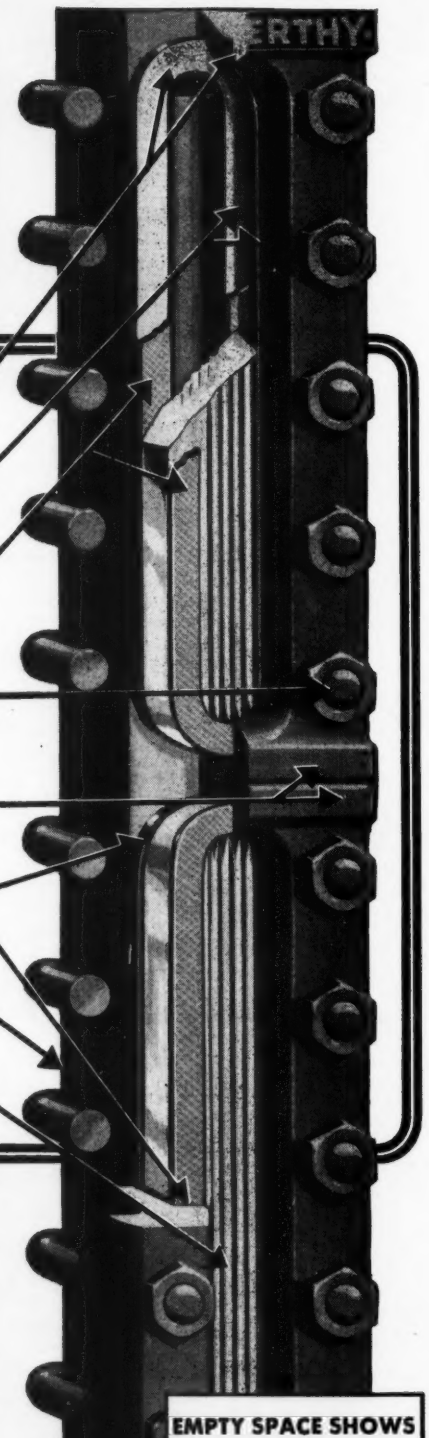

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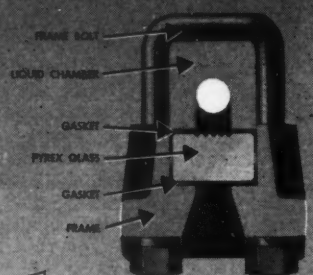

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REFINING

New Richmond, Calif., Wax Plant Now in Production

Standard Oil Co. of California's new wax plant at the Richmond, Calif., refinery, which has been under construction since easing of equipment and supply shortages following the end of the war, is now in production, the company reports, and will turn out approximately 45,000,000 lb. of wax per year.

Serving primarily the western markets and the Pacific Coast, the new plant will produce refined wax of high, medium, and low melting points from California crude.

The company states that about 29 per cent of production will be of the most pliable, low-melting point grade, 125 to 130 A.M.P., used largely in the manufacture of milk cartons. About 54 per cent will be of medium melting point for waxed paper. Higher melting point wax will be used for specialized purposes.

Wax on the Pacific Coast and in the western states has been in short supply during and since the war, and the new plant is expected to be of primary importance to western industry, in supplying current and future needs.

At the new plant, slack wax, a mixture of various oils and waxes produced as a refined byproduct in the processing of lubricating oil, is separated into three different melting points by heat.

Pure to Build Lube Plant At Its Savannah Terminal

Acquisition of a lease for 35,000 sq. ft. of ground adjoining Pure Oil Co.'s 50-acre plot at Savannah, Ga., marks the first step toward construction of a new lubricating-oil processing plant. Announcement of the lease acquisition was made by David D. Irwin, vice president.

Present plans call for expansion of Pure's Savannah terminal operations, to include blending of lubricating oils into finished products, and packaging into drums and cans for shipment into neighboring marketing areas.

When the plant is completed, lubricating oil stocks are to be brought to the Savannah plant by tanker from Pure's lubricating and grease plant at the Smiths Bluff refinery near Beaumont, Tex., which is expected to be operating early this year.

The Savannah plant will have equipment for blending, processing, and packaging more than 4,000,000 gal. of lubricating oils from base stocks. A large gallonage of a wide variety of industrial oils and greases also will be handled at the new plant.

Standard Refinery Runs Pass Expectations, Peake Says

A. W. Peake, president, Standard Oil Co. (Ind.) told the New York Society of Security Analysts recently that crude-oil production and refinery runs of the company were ahead of expectations in 1948.

The company's net crude-oil production for last year averaged approximately 224,000 bbl. daily, Peake reported. This is in comparison with an estimate of 220,000 bbl. per day.

Crude-oil runs to the company's refineries averaged 437,000 bbl. per day compared with an estimate of 430,000 bbl. per day made last spring.

Indiana Standard drilled approximately 600 wells during 1948, of which about 100 were dry holes, Peake told the society. He added that the company's capital expenditures in 1949 will be "substantially" lower than 1948. The 1948 capital outlays were about equal to the $220,000,000 spent in 1947.

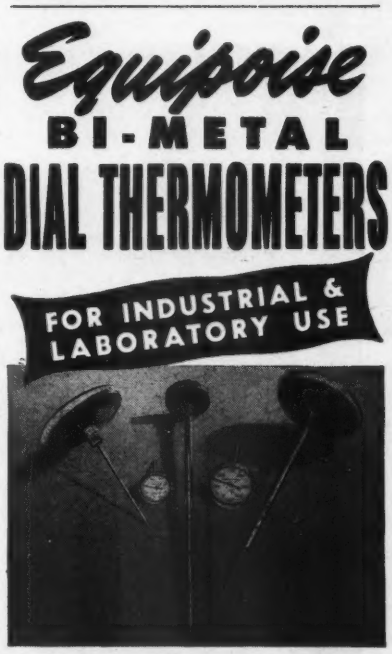
A.P.I. Lube Committee Meets In St. Louis February 21-23

The lubrication committee of the American Petroleum Institute will meet at the Jefferson Hotel in St. Louis, Mo., February 21-23. The first two days of the meeting will be devoted to business sessions. It is the first of four such meetings of the committee to be held throughout the year.

Dayton F. Clark, Gulf Oil Corp., the 1949 committee chairman, has announced names of seven of the nine scheduled speakers and their topics. They include:

Morning session, February 23: "Cutting Fluids—An Engineering Responsibility and a Marketing Opportunity," W. H. Oldacre, D. A. Stuart Oil Co., Ltd., Chicago; "Modern Greases Mean Simplified Lubrication," F. H. Ott, Union Oil Co. of California, Los Angeles; "Power-Transmission Fluids—A Challenge to the Service Station," H. L. Moir, Pure Oil Co., Chicago. J. C. Nourse and C. McKee of Nourse Oil Co., Kansas City, Mo., will speak in the morning session, but their topic has not been announced.

Afternoon session, February 23: "Presenting Automotive Gear Oils," T. P. Sands, Monsanto Chemical Co., St. Louis, Mo.; "A Consumer's Appraisal of Technical Petroleum Training Programs," E. H. Erck, Pioneer Eclipse Division, Bendix Aviation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Corp., Teterboro, N. J.; and "A Consumer's Goals in Lubrication," John Boyd, Westinghouse Corp. research laboratories, East Pittsburgh, Pa.

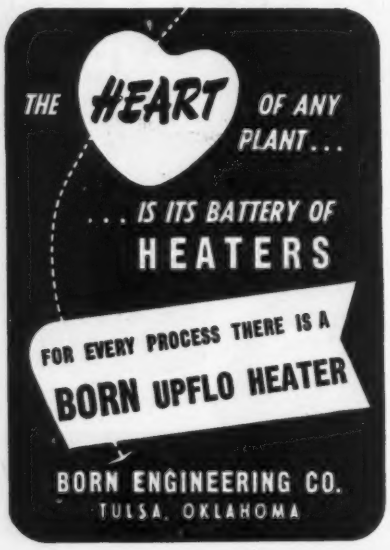
Colorado's First Cracking Unit on Stream After Test

Colorado's first catalytic cracking unit, at Denver, is now on stream, after having successfully undergone an official test run beginning December 26, Harold G. Osborn, vice president in charge of manufacturing of Continental Oil Co., operators of the unit, announced.

The Houdry thermofor unit is the sixty-ninth Houdry-licensed catalytic cracker to go into operation, officials stated. Continental operates four such units, three of them at the Ponca City, Okla., refinery.

Designed to operate at a fresh feed reactor charge rate of 3,300 bbl. per day, the unit has a one-to-one internal recycle ratio to provide maximum flexibility with respect to gasoline and fuel-oil production. Capacity rating is 6,600 bbl. per day.

Osborn reported that contractual guarantees, with respect to yields and product quality, were exceeded by a substantial margin.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Noted Speakers to Address A.S.L.E. Meeting April 11-13

Several noted speakers, including Dr. Harmon Blok, Royal Dutch Shell Co., Delft, Holland, will address the fourth annual convention of the American Society of Lubrication Engineers at the Statler Hotel in New York April 11-13, according to an announcement by the program committee. Dr. Blok will journey from Holland especially for the convention, and will speak on 'Hydrodynamic Lubrication."

Other special speakers include Dr. Severin Raynor, senior engineer in applied mechanics research, and Dr. Eric F. Lype, research engineer in applied mechanics, Armour Research Foundation. Eighteen other speakers will talk on pertinent subjects during the 3-day meeting.

Running concurrently in space adjoining the convention will be the annual lubrication show sponsored by the A.S.L.E. This will include a special display showing Union Carbon & Carbide Corp.'s latest products of synthetic materials for industry. Wm. W. Nugent & Co. will exhibit the Nugent sight-feed valves, new simplex and duplex filters, and compression union fittings.

Barnsdall's Gas Plant at Newhall Nears Completion

The 40,000,000 cu. ft. per day gasoline recovery plant for Barnsdall Oil Co., at Newhall, Calif., is nearing completion, according to Refinery Maintenance Co., Compton, Calif., builders, and should be finished in June. The plant will feature a new rich-oil stabilization system.

Refinery Maintenance, which was organized in 1943 to handle maintenance work for refineries in California, now has expanded into the Mid-Continent and Gulf Coast areas. In 1947 the company entered into design and engineering of turnkey projects for the oil and gas industries, of which the Barnsdall project at Newhall was the first.

Cities Service Develops New Household Grease

A new lubricant, "Handi-Lube," which will not oxidize and will meet all conditions of high and low temperature operation from 250° to —40° F., has been announced recently by Cities Service Oil Co.

The new household grease is an addition to the company's home products line and is packaged in a nozzle-applicator type tube rather than in the usual 1-pound can.

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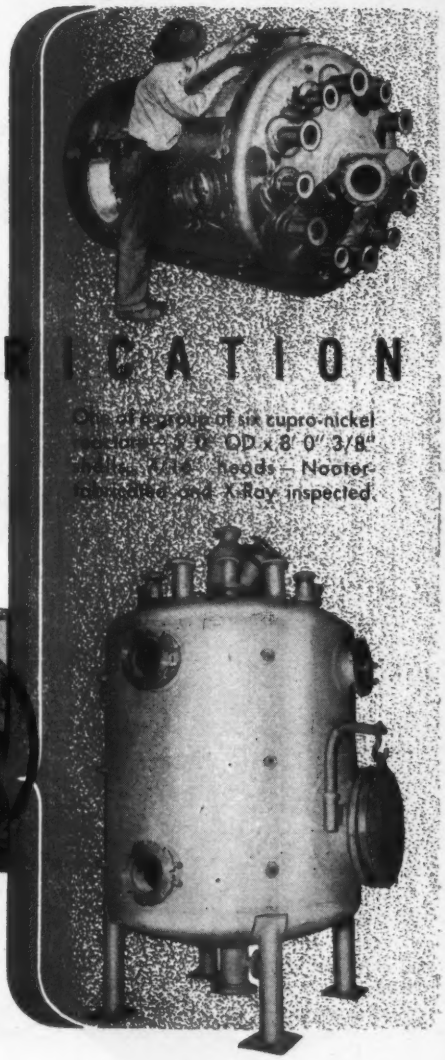

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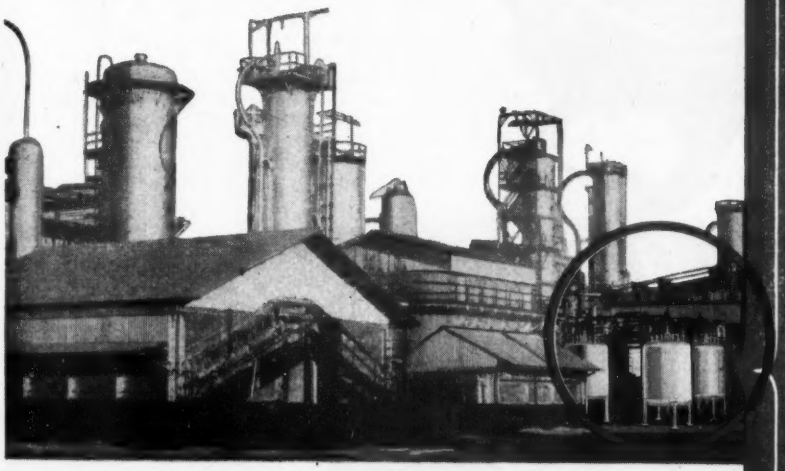

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PIPE LINES

Plans for New Pipe Lines In Venezuela Progressing

Pipe-line projects for crude oil, refined products, water, and natural gas in Venezuela are planned and under way by Creole Petroleum Corp., Shell Caribbean Petroleum Co., and Venezuelan Oil Concessions, Ltd.

Creole has authorized but not contracted the laying of the 10.3-mile, 8-in. products pipe line from a location 30 ft. above sea level on the Caribbean Coast at Catia de la Mar to the terminal planned at Nuevo Caracas; this line crosses the Avila Mountains at 3,000 ft. elevation. Creole has also authorized but not contracted construction of a 61.5-mile 30 and 34-in. water line from Siburua Springs to supply refining facilities now under construction at Amuay Bay on the Paraguana Peninsula. Projects under consideration by Creole include the Bachaquero-Lagunillas 13.8-mile, 24-in. crude oil on the Bolivar Coast of Laka Maracaibo as well as a 20.5-mile, 8-in. products pipe line from Puerto Cabello to Valencia. Final completion of facilities for Creole's Ule-Amuay, 145.5-mile, 24 and 26-in. crude-oil line, contracted by Williams Brothers Co., has been scheduled for June 1949.

Venezuelan Oil Concessions, Ltd., is building a 34-mile, 6 and 8-in. natural-gas pipe line from La Paz to the industrial area of South Maracaibo, to be completed early this year. Shell Caribbean Petroleum Co. laid 8 miles of 12-in. pipe for crude-oil service in 1948 from Cuatros Bocas (Mara field) to the Palmarejo Lake terminal.

Bolivian Line Prepares For Deliveries to Sucre

The 6-in. crude-oil pipe line under construction for Yacimientos Petroliferos Fiscales Bolivianos between Camiri and Cochabamba has been filled with gasoline as far as Zudanez so that it may be ready to make deliveries to Sucre as soon as the 45-mile, 4-in. Zudanez-Sucre lateral is completed.

Although the line has been planned for crude-oil transportation to refineries now under construction at Sucre and Cochabamba, Y.P.F.B. is counting on using the system for gasoline transportation in the early stages of operation. Crude oil of Camiri area of 56° to 58° A.P.I. gravity from the Camiri area is processed in a plant at Camiri.

Construction of the project by the contractor, Williams Brothers Co., has been pushed as far as Aiquile and it is expected that this month the project will be completed as far as Tin Tin, 255 miles from Camiri. The 80-mile section of 6-in. between Tin Tin and Cochabamba is scheduled for completion in June 1949. Williams Brothers operations are supervised by George Allen; the contractor's headquarters are at Cochabamba. Five

Welding 24-in. pipe in the Wichita Falls-Cushing, Okla., section, contracted by Smith Contracting Co. This is the northeastern end of the Basin System constructed by Texas Pipe Line Co. as a joint project of four companies

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Line-Pipe Production Up In 1948; New Record Looms

Output of line pipe, used mostly in the transporting of oil and gas from well sites, was up considerably in 1948 over 1947 production, and new records in its manufacture are anticipated in 1949, according to Earl W. Clark, director of the office of industry cooperation, Department of Commerce.

Output reached 2,221,084 tons in 1948, compared to 1,200,000 tons in 1947, and 796,000 tons in 1940. The estimated production in 1949 is 2,553,517 tons, or 246 per cent more than the prewar average. There is a chance, Clark stated, that total production during 1949 might be raised to 2,675,617 tons. Production will still fall short of the industry's needs, however, Clark predicted.

Clark made this announcement in reporting on production of oil-country goods of all types. He said that production of tubular goods used mainly in drilling operations totaled 1,674,876 tons in 1948 compared with 1,399,000 tons in 1947, and 1,028,000 tons in 1940. Estimated production for 1949 is 1,803,103 tons, against an estimated need amounting to 1,840,400 tons this year.

Tremendous strides have been made in narrowing the gap between production and demand, Clark said. His prediction that line-pipe output would fall short of needs of the oil and gas industries during 1949, despite the anticipated record production, based on an estimate by the Department of the Interior.

Michigan Gas Storage Line Pipe Size to Be Changed

Authorization of Michigan Gas Storage Co., Jackson, Mich., to substitute approximately 113 miles of 20-in. pipe for 24-in. pipe has been given by the Federal Power Commission. The new order also authorizes the company to install additional compressor units in the Freedom Junction compressor station in Michigan which would increase the total authorized capacity of the station to 8,400 hp. instead of the 6,400 hp. previously authorized, and to construct a 4,000-hp. compressor station to be located at Laingsburg Junction, Mich.

Michigan Gas requested the modification because it was unable to obtain the necessary 24-in. pipe. The company was able to acquire the necessary 20-in. pipe, however.

The company was authorized to utilize certain pipe-line facilities of Consumers Power Co. temporarily pending completion in 1950 of the complete 20-in. line. These facilities,

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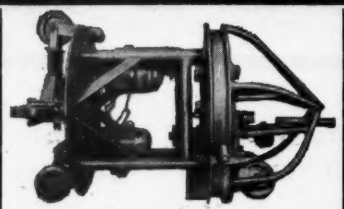

The electric model shown below is a rugged, heavy-duty clamp, electrically operated for the tough jobs.

ADVANTAGES:

For The Owners:

Better stringer bead; better finish weld; better pipe line.

For The Builder or Contractor:

Speed; stringer bead cut-out eliminated; economy; swabbing and alignment with one tool; less labor required.

Available for pipe sizes 12" through 36"
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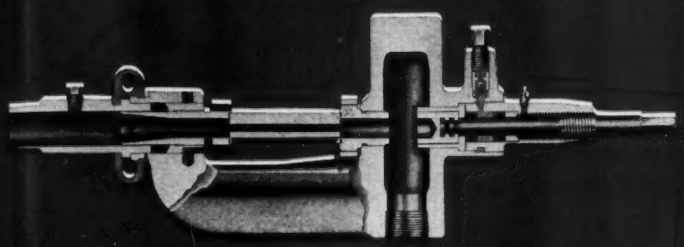
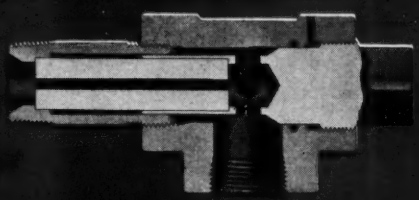
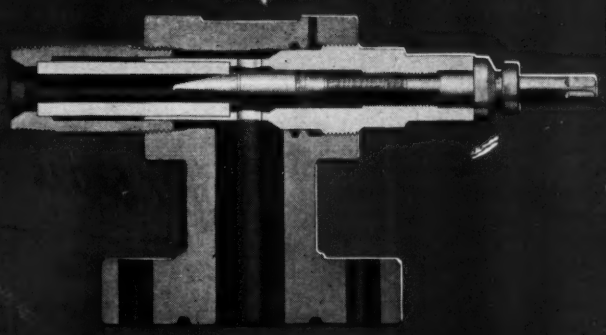


Cameron Type "D" Flow Wing



Cameron Type "G" Positive Choke



Cameron Type "G" Adjustable Choke

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CAMERON
FLOW WINGS
AND CHOKES
—worthy companions
for any well heads
you may choose!

Cameron Flow Wings are unique in that they not only provide all the fittings required for a complete Christmas tree wing in a single, compact unit, but greatly simplify the choke changing operation. Note that the flow bean, or choke, is not enclosed, making it instantly accessible. Two turns on a clamp screw releases the bean. There are no threaded connections to break out or flanges to remove for this operation. It's fast and simple. A built-in, easy-to-operate valve provides a shutoff while changing chokes. No need to close any vital valves on the Christmas tree.

The new Cameron Type "G" Chokes feature a positive and adjustable choke assembly interchangeable in one choke body. *No bean wrenches are required to change* beans. Note that the bean retainer provides a tight friction grip around the bean so that when the retainer is backed out of the body the bean is retrieved with it. As a safety feature, pressure trapped in the body is automatically relieved thru a port before the retainer is removed.

Complete details will gladly be sent to interested operators on request.

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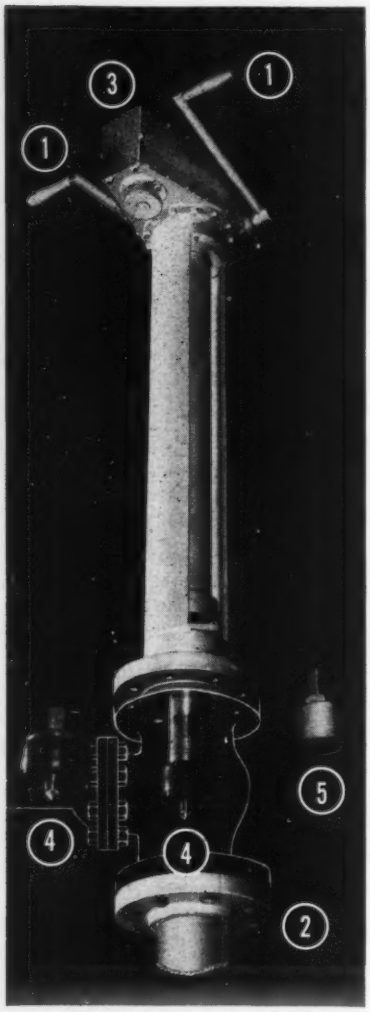
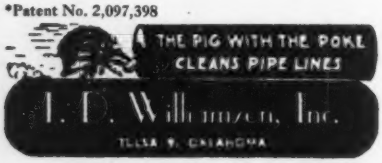
Made
EASIER . . . SAFER
-With-
HILLCO Model 600
MACHINE*



2,000 p.s.i. test pressure.
Maximum tap: 6" standard (8" special).
Power: air motor or manual—dual cranks 1.
Flanged (or threaded) Tapping Nipple 2, welded to pipe line.

Automatic feed 3, protects shell cutters 4.
Pilot Drill 4, holds "coupon" in shell cutter.
Nipple Plug 5, permits removal of tapping valve . . . an exclusive feature.

*Patent No. 2,097,398



together with the portion of 20-in. line to be constructed, will provide an additional connection to the storage fields for use next winter. Facilities in this instance will be used by the company with those previously authorized by the commission for storage of natural gas in the Winterfield and Cranberry Lake gas fields of Michigan.

Texas Gas Hearing Is Scheduled February 24

Hearings will open February 24 by the Federal Power Commission on the application of Texas Gas Transmission Corp. for authorization to construct its 800-mile natural-gas line from Texas to Ohio.

The full five-man commission will hear oral arguments and will pass directly on the application thereby waiving the intermediate procedure requiring a recommendation by the trial examiner. Filing of briefs will be permitted on or before February 14.

Texas Gas recently completed 63 miles of pipe line from Lula, Miss., to Memphis, Tenn., as a portion of the proposed 800-mile line. Arrangements to finance the project have been completed. *(See The Oil and Gas Journal, January 20, page 112).* More than 230 miles of 26-in. pipe has been delivered along the right-of-way; arrangements for the receipt of the balance of pipe needed have been made; and aerial and ground surveys of the entire route have been completed and over 50 per cent of the right-of-way acquired.

W. T. Stevenson, executive vice president of Texas Gas, said also that the company has negotiated long-term gas purchase and sales contracts for supplies of gas at the southern terminus of the line, and distribution at the northern terminus, in addition to taking care of the needs of the company's existing customers.

FPC Permits Delay in Start Of Tennessee Natural Line

The Federal Power Commission has authorized East Tennessee Natural Gas Co., to delay for 6 months starting construction on an $11,470,592 project consisting of 186 miles of pipe extending from Tennessee Gas Transmission Co.'s main line to the Chickamauga Dam area near Chattanooga, Tenn., and a 112-mile line extending to a point near Knoxville, Tenn., due to shortage of steel pipe.

The 1-year deadline set by the commission authorizing the facilities expired on February 2, 1949. The company recently filed an application with FPC stating that due to the pipe shortage it could not commence construction within the time allowed, and requested the 6-month extension.

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CLARENCE L.
BOYD
CO.
TULSA, OKLAHOMA

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1369 Miles

During our fiscal year, ending Nov. 30, 1948, five spreads of Latex Construction Company laid and took up a grand total of 1369* miles of pipe. This imposing mileage of pipe line work was divided as follows:

Miles of Pipe laid, 16" and larger	588
Miles of Pipe laid, 8", 10" and 12"	379
Miles of Pipe taken-up and reconditioned	402

*This figure does not include the mileage under contract at the end of 1948, to be completed during 1949, amounting to 181 miles.

LATEX CONSTRUCTION COMPANY

General Contractors

OIL — GAS — GASOLINE — WATER PIPE LINES

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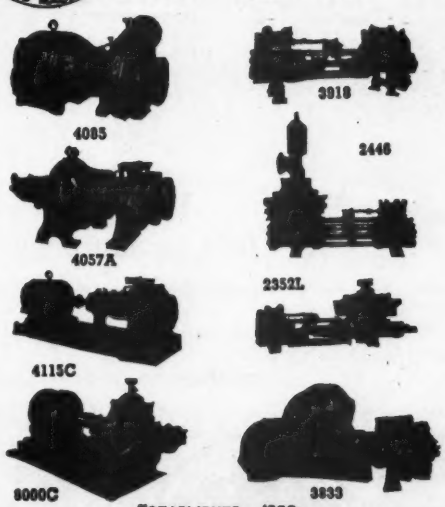

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The Globe 2-Cutter Rock Bit is the most sensational performer in the field for fast digging . . . long runs . . . total footage . . . straight hole . . . petroleum exploration . . . hole straightening . . . hard digging . . . and just plain drilling. Party chiefs say it is doing a job never previously accomplished in geophysical work. Available in all standard sizes from 3¾" up. See your nearest Globe office or representative.

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Among the

Drilling Contractors

Louisiana Issued 2,557 1948 Drilling Permits

HOUSTON. — Louisiana's department of conservation last year issued 2,557 drilling permits, an increase of more than 30 per cent over the 1947 total of 1,953 permits, Commissioner S. L. Digby has announced.

The annual figures, prepared by A. A. Massicot, department office manager, show that 1,583 of the 1948 permits were for operations in North Louisiana, 974 for South Louisiana. In the previous year, 1,130 permits went to North Louisiana, 823 to South Louisiana.

By months, the 1948 permits were: January 150, February 141, March 208, April 237, May 232, June 216, July 238, August 229, September 243, October 224, November 229, December 210.

H & M Drilling Co. has staked its 1 Truman, SW SE SE 21-25s-3e, Butler County, Kansas.

Foster Drilling Co. will drill its 2 Deacon, NW NW SE 25-17n-5e, in Lincoln County, Oklahoma.

Canada West Drilling Co. will drill Hargal Leduc No. 1, LSD 5, 10-50-26w4.

Cook Drilling Co. will drill Gordon Oil Co. and Basin Ohio Oil Co. 1 Leo Anderson, SE SW NE 35-3n-12w, in Allegan County, Michigan.

William H. Mannon has rejoined Camay Drilling Co. after serving Southern California Petroleum Corp. as assistant geologist and petroleum engineer for 1½ years. He will serve Camay as drilling engineer and assistant to the general manager.

Kendrick Drilling Co. has contract for Lawrence Potter et al 1 Long Bell Lumber, SE NW SW 6-6n-13w, a 3,250-ft. test 3 miles south of Sardis in Sabine Parish, Louisiana.

Big Chief Drilling Co. has contract for William Helis 1 Lehman Brothers, NW NW 28-7n-2e, near Oldenburg in Franklin County, Mississippi.

H-E-R Drilling Co. has staked its 1 Grassman, NE NE SE 20-20n-4w, southwest of the Brown pool in Garfield County, Oklahoma.

Commonwealth Drilling Co. has contract for Pacific-Western-Evansburgh No. 1, LSD 13, 31-54-7w5, about 55 miles northwest of Leduc-Woodbend field.

Woods Drilling Co. has started its 1 John Goss, NW SW SW 7-18n-5e, a 3,000-ft. test in Pawnee County, Oklahoma.

Crew of Allen & Morris, San Antonio, drilling for Fred Shields on Refugio Town Tract Survey, Refugio, Tex. Sam H. Smith, Oilwell Supply Co.; J. J. Murphey, driller; Cecil Rodgers; S. B. Riley; A. L. Bagwell; F. W. Ward

USE 'BESTOLIFE IT'S BETTER

'BESTOLIFE—the Lead Seal Joint Compound used successfully in the Drilling and Refining Industries for years — is immediately available through more than 100 distributors in the U.S.A.

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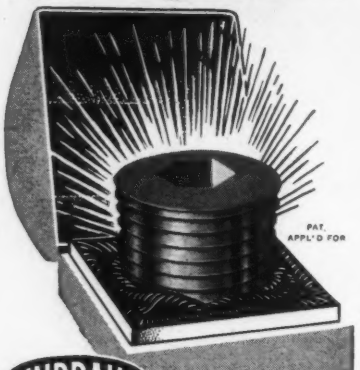

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PRESSURE PLUGS

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"Unbrako" Plugs—made by the manufacturer of the famous "Unbrako" Socket Screw Products—are available in National Pipe Thread sizes from ⅛" to 1¼". Write for detailed information and samples.

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gives you *truly* dry gas or steam

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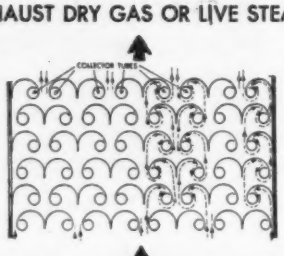


WET GAS OR STEAM INLET

New baffle principle completely knocks out *all* liquid and mist from *any gas or steam*. Exceptionally *high capacity*. Write for complete, descriptive MIST-D-FIER Bulletin.

J. A. CAMPBELL CO.
645 E. Wardlow Road, Long Beach 7, Calif.

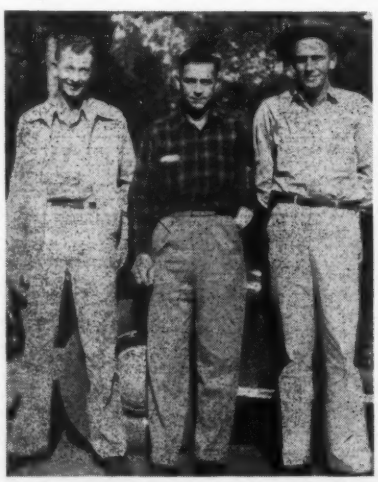
Southeastern Drilling Co. Jackson, Miss.

Southeastern Drilling Co., owned and operated by W. P. Clements, Jr.; I. P. LaRue, and I. P. LaRue, Jr., with offices at 1804 Tower Building, Jackson, Miss., is a comparative newcomer in the contract-drilling business. The partnership started in Mississippi about 2 years ago. Its two rigs were kept busy by Sun Oil Co., Tide Water Associated Oil Co., and the company's own drilling.

Equipment.—Equipment now in operation include one 15,000-ft.-capacity diesel power rig and one 11,000-ft.-capacity diesel rig in Louisiana; one 9,000-ft. diesel rig in Mississippi, and one gas-butane-powered outfit, also rated at 9,000 ft., in West Texas.

Personnel.—W. P. Clements is general manager of the partnership. W. W. (Bill) Gray is drilling superintendent for Mississippi and Louisiana, and Howard Scallorn is superintendent for West Texas. Vel Johnson and Howard Archer are tool pushers.

Sidelights. — The company owns production in Baxterville field, Lamar County, and in Heidelberg field, Jasper County, Mississippi. At this time one of its crews is nearing the completion stage at Helis and Danciger 1 M. E. Smiley, 8,500-ft. wildcat and prospective discovery well in 9-7s-5e, Livingston Parish, Louisiana.



Southeastern Drilling Co. men on location; Howard Scallorn, superintendent for West Texas areas; Bill Gray, superintendent in Mississippi and Louisiana; and Vel Johnson, tool pusher

Canada-West Drilling Co. is drilling Calmar-West No. 1, LSD 13, 31-49-26w4, an exploratory test in the southwest Leduc area.

Peel Drilling Co. and **Derby Oil Co.** have location for 1 Beran, SE SE SE 13-17s-12w, in Barton County, Kansas.

Seran Drilling Co. will drill Gulf Coast Western Oil Co. and Creekmore-Rooney 1 Partridge, NW SE NW 8-12n-9e, a 3,500-ft. test in Okfuskee County, Oklahoma.

Mars Drilling Co. has contract for Russell Maguire 1 Vanbebber in the S. Davidson Survey A-194, 5 miles southwest of Montague in Montague County, Texas.

Signal Drilling Co. will drill a wildcat test for Dyer & Rice in NW SE 30-5n-68w, on the west side of the Denver basin, in Weld County, Colorado.

R. M. Bass will drill Paul H. Pewitt F-1 Pickering Lumber, a 6,500-ft. test on the south flank of the Joaquin pool in Shelby County, Texas.

Drilling Contractors, Ltd., has contract for the first well of Anglo Canadian Oil Co. and Home Oil Co. in Woodbend field, LSD 16, 19-51-26w4.

Noble Drilling Co. has contract to drill The California Co. 2 Louisiana State Lease 1277, Main Pass Block 69 field, offshore Plaquemines Parish. Projected depth is 4,000 ft.

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Is the driller's best friend because it makes the easiest brake known and "feeds off evenly while drilling." It never scores brake rims. See pages 3608-3613, Composite Catalog.

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Add regularly to fuel and motor oil
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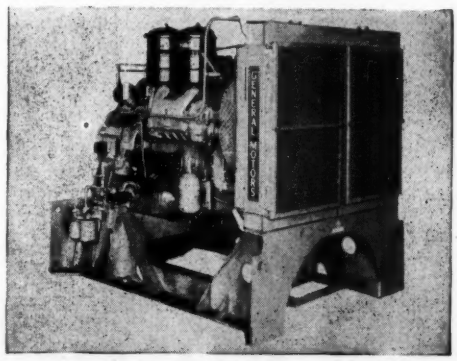

GM 6-71 TWIN DIESEL ENGINE WITH GEAR REDUCTION

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Crews of selected and seasoned men
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Based upon 300 crew-years of experience in all sections of the country

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NATIONAL GEOPHYSICAL COMPANY, INC.

MIDLAND DALLAS HOUSTON

Crossroads Pool in New Mexico Developing Cautiously

CROSSROADS field in eastern Lea County, New Mexico, a Devonian discovery by Mid-Continent Petroleum Corp. in 1948, at 12,000-ft. depth, is now being watched carefully. The second well is producing, a third is running so high it is practically in, the fourth and fifth tests are feeling their way slowly, because they are checking lower than either producer. A sixth well, 3 miles north and 1 mile east of the nearest production, is reported to be on a separate structure.

The plat below shows the location of the wells, and the letters indicate their relative position on top of the Devonian, "A" being the highest to date, and "E" the lowest. Their relative positions on top of the Devonian seem to be tied closely to the thickness of Pennsylvanian and Mississippian cut in each well.

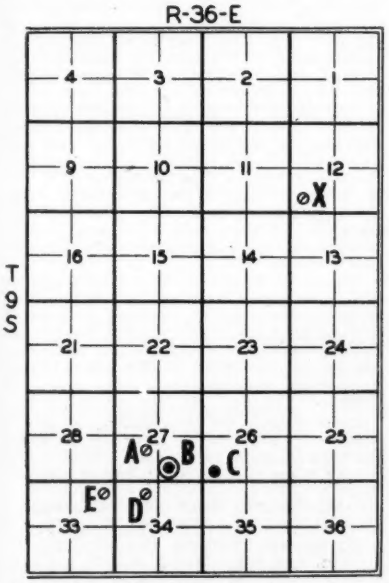
A cross-section from north to south, A-B-C-D, shows Mississippian thicknesses as follows: 440, 531, 546, and 579 ft. A west-to-east cross-section, E-D-B-C, shows Mississippian thicknesses as follows: 605, 579, 531, and 546 ft.

Pennsylvanian thickness comparisons are complicated by the fact that Magnolia Petroleum Co. geologists seem to differ from the others, in what they consider the top of the Pennsylvanian, placing it 500-600 ft. higher in the section. Excluding well C, the north-south cross-section A-B-D, shows Pennsylvanian thicknesses of 1,775, 2,065, and 2,225 ft. The west-east cross-section of the Pennsylvanian E-D-B, shows 2,410, 2,225, and 2,065 ft.

Pennsylvanian plus Mississippian thicknesses on north-south cross-section A-B-D, are 2,215, 2,596, and 2,804 ft. The combined thicknesses on the west-east cross-section E-D-B, are 3,015, 2,804, and 2,596 ft.

The amount of penetration in the Devonian is pretty much in accordance with how high the top is caught. From the data available at this time the interpretation is a structure rising from west to east, from well E to well B, then dropping off a little to well C. From north to south, well A is considerably the highest, then dropping steadily to B to D. If well A makes a producer in proportion to its structural position, and E also makes a good producer, future development is likely to proceed with less caution.

Right now, the cost of 12,000-ft. wells and the geological uncertainties are forcing all the operators to proceed with the greatest of caution. This is a long way north of the other New Mexico pre-Permian development and geologically is in an area where it is questionable whether the north-south Central platform forces or the east-west Matador uplift forces are primary.



Well A—Mid-Continent Petroleum Corp. 1 Dessie Sawyer; B—Mid-Continent U. D. Sawyer 1-A Sawyer (discovery well); C—Magnolia Petroleum Corp. 1 Santa Fe-Pacific Co.; D—Mid-Continent U. D. Sawyer 1-B; E—Skelly Oil Co. 1 U. D. Sawyer; X—Magnolia 1 Cox-Federal

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN AREA.—The California Co. recovered 2,200 ft. of 34°-gravity oil on a 30-minute test in the Muddy sand at its Borie wildcat in Laramie County, Wyoming, and the well will apparently be a discovery in that zone. Phillips Petroleum Co. et al logged saturation at the Northwest Sheldon Dome, Wyoming, wildcat and will test the sand in the Chugwater before drilling to the Embar and Tensleep. Phillips will make a Tensleep test of its well at South Cole Creek, Wyoming, after making drill-stem tests in the Lakota sand.

WEST TEXAS.—Standard 3-1 Brown, second well in the North Snyder field, Scurry County, found additional pay in testing at 6,400-44 ft., where it flowed at the rate of 60 bbl. an hour. One and one-half miles to the west, Humble 1 Perriman flowed 30-35 bbl. of oil hourly from 7,004-50 ft., tentatively identified as Strawn, below the Canyon pay of the North Synder field. Location was staked for Humble's 1 Edmondson, 1 mile west and ¼ mile south of the 1 Perriman. Slick-Urschel 1 J. S. Elliott, west outpost at Benedum, was the field's twelfth producer, flowing 121 bbl. of oil from the Ellenburger at 11,405-441 ft.

EAST TEXAS.—The South Tyler field discovery well, originally completed in 1944, plugged back on its second recompletion and discovered a new pay in the Rodessa.

CALIFORNIA.—The third high gravity pool in the Russell Ranch field in Cuyama Valley was found at Richfield Oil Corp. 18-30 F. R. Anderson. The well flowed 1,194 bbl. of oil from a new zone about 500 ft. lower than the producing level of the discovery well of the White Rock area of the field.

CANADA.—Piccadilly-Porcupine Gold Mines, Ltd., and the Interleduc Syndicate plan immediate follow-up flank drilling to their 1 Edwards, wet gas discovery in the Stettler area, northeast of Calgary.

TEXAS GULF COAST

Texas Gulf Producing Gets Field Opener at Hartburg

HOUSTON. — Texas Gulf Producing Co. and Rowan Drilling Co. have opened a new oil field, "Hartburg," for Newton County. The discovery well is 1 Morgan et al, located in the W. B. Ellis Survey, ¼ mile west of Hartburg, approximately 8½ miles east of Gist production and 3 miles west of the Texas-Louisiana state line. Drilled to a total depth of 8,013 ft., with 7-in. casing cemented to 7,556 ft., the well was completed through open hole flowing 198 bbl. oil per day through ⅛-in. choke, gas-oil ratio 780, tubing pressure 1,475 psi.

A new deep oil sand on the southwest flank of Gillock field, Galveston County, has been opened by Pan American Production Co. 1 Citizens National Bank of Denison, located in the James Smith Survey. On potential gage the well flowed 200 bbl. of oil per day through a 10/64-in. choke, through perforations at 9,109-16 ft. Total depth is 9,147 ft.

The Texas Co. 1 Newton County Lumber Co., a wildcat in the central portion of Newton County, is reported flowing 44 bbl. of fluid per day, through perforations at 9,644-60 ft., making approximately 60 per cent oil, the remainder being wash water. This test is located in the Johathan D. Ray Survey, 10½ miles southeast of Call. Total depth is 12,610 ft., and 7-in. casing cemented to a depth of 11,514 ft., with a 5-in. liner from this point to the bottom of the hole. Operators are continuing to test.

Butcher-Arthur, Inc., 1 John A. Jones, a wildcat southwest of Coldspring production in San Jacinto County, is testing section from 4,382-92 ft. On drill-stem test in this section, using ¼-in. chokes top and bottom, with 500-ft. water cushion, developed 500 psi. working pressure and recovered black colored condensate. Total depth is 4,409 ft.

The 45 new locations reported for Districts 2 and 3 included 12 wildcat starts, 1 each in Chambers, Fort Bend, Goliad, Jefferson, Lavaca, Liberty, Live Oak, Matagorda, Refugio, Victoria, Waller, and Wharton counties. Three successful exploratory tests were completed, one each in Galveston, Jefferson, and Newton counties, while six wildcats were dry, two each in Brazoria and Victoria counties and one each in Harris and Wharton counties.

TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCATS

Galveston County: New oil sand, Gillock pool—Pan American Prodn. Co. 1 Citizens National Bank of Denison, in James Smith Sur., TD 9,147 ft., top sand 9,056 ft., perf. 9,109-16 ft., IP: 200 bbl. oil per day through 10/64-in. choke, GOR 1,571, TP 1,500 psi., gravity 37.4°, no water.

Jefferson County: New gas-condensate pool—Stanolind Oil & Gas Co. 1 Frank Burrell, in J. C. Lawhon Sur., ¾ mi. NE of Gilbert Ranch gas-condensate production, TD 8,726 ft., top sand 8,675 ft., perf. 8,675-87 ft., IP: 2,500,000 cu. ft. gas per day through a ¼-in. choke, no gage on condensate, open flow 43,000,000 cu. ft. gas per day, TP 2,815 psi., shut-in pressure 2,915 psi.

Newton County: New oil pool, Hartburg—Texas Gulf Producing Co. and Rowan Drilling Co. 1 Morgan et al, in W. B. Ellis Sur., ¼ mi. W of Hartburg townsite, TD 8,013 ft., top sand 7,512 ft., open hole 7,556-60 ft., IP: 198 bbl. oil per day through ⅛-in. choke, GOR 780, TP 1,475 psi., gravity 42.6°.

TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Brazoria County: C. H. Alexander 1 M. S. Drake and L. L. Barnes, in W. D. C. Hall Lge., Geo. W. Jenkins S/D, Lot 3, 2½ mi. SE of Pearland, dry, TD 8,970 ft.

Humble Oil & Refining Co. 1 East Freeport State Tract 278, Gulf of Mexico, 6½ mi. offshore south of Oyster Bay, dry, TD 10,224 ft.

Harris County: Union Producing Co. 1 A. D. Polemanakos, Pierce Sullivan Sur., A-749, West Aldine area, dry, TD 8,000 ft.

Victoria County: W. G. Darsey, Jr., 1 Earl Rydolph, in A. Perez Gr., 1 mi. W of Bloomington, dry, TD 5,178 ft.

Fidelity Oil & Royalty Co. 1 Mrs. Mettie Johnston, J. M. Cobarrubias Gr., 6½ mi. SW of Victoria, dry, TD 5,126 ft.

Wharton County: Sohio Petroleum Co. 1 Edwin Hawes, Jr., in Sylvanes Castleman Sur., 2 mi. W of Lane City townsite, and field, dry, TD 5,932 ft.

MISSISSIPPI

Barnsdall Oil Opens New Field in Franklin County

JACKSON.—Bude field, the first discovery this year for Mississippi, has been opened at Barnsdall Oil Co. 1 J. A. Pittman, SW NW 29-5n-4e, Franklin County. This new discovery is located approximately 6 miles south of the townsite of Bude. Initial production gage was 356 bbl. per day, flowing through an 11/64-in. tubing choke, with flowing pressure of 2,150 psi. Gas-oil ratio 1,580, and gravity of the oil was 43.8°. Production is through perforations at 10.090-98 ft. Tops were picked as follows: Wilcox 4,575 ft., Midway 7,757 ft., chalk 9,181 ft., Base Austin 10,086 ft., first sand 10,300 ft., Marine Tuscaloosa 10,654 ft. Lower Tuscaloosa 11,024 ft., Massive 11,238 ft., Lower Cretaceous 11,246 ft.

In Roxie field area, Franklin County, Vaughey & Vaughey-Big Chief 1 J. M. Seab, 12-6n-2e, is waiting on cement after setting 5½-in. casing to 10,778 ft. Sand with oil saturation was cored from 10,696-706 ft. Operators plan to perforate and test sand section.

In La Grange field, Adams County, Milhoan Production Co. 3 Elizabeth Stanton, 84-7n-2w, has been completed flowing 144 bbl. of oil per day through a 10/64-in. choke, tubing pressure 265 psi., gravity 42.8°. Total depth is 6,178 ft., and production is through perforations at 6,105-07 ft. and 6,111-14 ft.

Vaughey & Vaughey 1 Preston Hart, 23-6n-8e, in Mallalieu field, Lincoln County, flowed at the rate of 476 bbl. per day, through ⅜-in. choke, tubing pressure 90 psi., gravity 37°, through perforations at 10,451-10,511 ft. Total depth is 10,520 ft.

Humble Oil & Refining Co. B-14 G. M. & O. Land Co., 30-9n-7w, Yellow Creek field, Wayne County, was completed on pump for an initial production of 23 bbl. per day, gravity 18°. Total depth is 5,167 ft., with production through perforations at 5,116-27 ft.

Two new wildcat locations were reported for Mississippi, one each in Greene and Lamar counties. Four development locations were reported, one each in LaGrange, Mallalieu, Oldenburg and Soso fields. One successful wildcat was completed to open an oil field in Franklin County while one wildcat was dry in Jefferson County.

MISSISSIPPI SUCCESSFUL WILDCAT

Franklin County: New oil field, Bude—Barnsdall Oil Co. 1 J. Pittman, SW NW 29-5n-4e, TD 11,308 ft., perf. 11,090-98 ft., IP: 356 bbl. per day through an 11/64-in. choke, TP 2,150 psi., gravity 43.8°, GOR 1,580. Marine Tuscaloosa 10,654 ft., Lower Tuscaloosa 11,024 ft., Massive 11,238 ft., Lower Cretaceous 11,246 ft.

MISSISSIPPI WILDCAT FAILURE

Jefferson County: Southern Oil Corp. 1 F. R. Hurley, 10-8n-2e, dry, TD 10,471 ft.

FLORIDA WILDCAT FAILURE

Volusia County: Grace Drilling Co. 1 Retail Lumber Co., 2-15s-30e, dry, TD 5,424 ft.

CALIFORNIA

New Zone Found At Russell Ranch

LOS ANGELES.—Richfield Oil Corp. has discovered a new pay zone in the Russell Ranch field of Santa Barbara and San Louis Obispo counties. On a test of 50 ft. of oil sand between 3,512-62 ft., the new well, 18-30 F. R. Anderson in Section 30-11n-27w, flowed at the rate of 1,194 bbl. a day of 36.8°-gravity oil, cut 0.5 per cent, through a 48/64-in. choke. The new zone lies about 500 ft. lower than that productive in the 37-30 Anderson, ¼ mile to the northeast. The latter was the discovery well of the White Rock area of the field.

This is the third high gravity pool to be found in this part of the Cuyama Valley by Richfield since last June. About 600 acres were proved productive by the end of the year within an area 2½ miles long and about 2,000 ft. wide. Forty-six wells have been completed, all but two by Richfield, for an aggregate daily production on a restricted basis of 13,500 bbl. a day. Gravity of the oil ranges from 33° to 38°. Most of the exploration to date in the Valley, which is 50 miles long and 5 or 6 miles wide, has been confined to the western part, so not much is known about the potentialities of the central and eastern portions. Wells to be drilled this year may determine whether this will ultimately become one of the state's important oil-producing basins.

Exploratory drilling in southern California's new townlot field at Newhall, Los Angeles County, is approaching the critical stage. A discovery was made here about 6 weeks ago by R. W. Sherman 3-1 Newhall Community, Section 35-4n-16w. This well began flowing through the casing after a gun perforating job last month and, until shut in to complete in the conventional manner, made from 300 to 900 bbl. a day of 40.3°-gravity oil. A townlot drilling campaign immediately got under way and a second well, M. E. Frazier 2 Eagle-Bishop is reported in the sand which is understood to be very tight. In the meantime a mechanical problem has prevented the completion of the Sherman well. With 12 wells drilling, an additional 20 or 30 projects are understood to be awaiting the outcome of the Frazier well and the successful completion of the Sherman discovery.

Production in the Guijarral Hills field of Fresno County has been extended a short distance to the northeast by the completion of Standard of California's 5 35-F, Section 35-20s-16e. The well made 775 bbl. of 37°-gravity oil from the interval 8,753-8,805 ft. Indications are that this field, discovered last September, will rank next in importance to Richfield's Cuyama Valley discovery.

Discovery of a new pay zone south of the main Edison field in Kern County has been confirmed by the completion of Beloil Corp.'s 36-26-2 Lawson-Bennett, Section 36-30s-29e, which is producing an estimated 300 bbl. a day of 26°-gravity oil on pump. Production is coming from just above the schist.

Tevis F. Morrow is preparing to drill a wildcat 1½ miles northeast of the the Santa Fe Springs field on a block of leases totalling 650 acres. A 7,000-ft. test is planned.

CALIFORNIA WILDCAT FAILURES

Kern County, Arvin area: The Ohio Oil Co. 1 Mitchell, 3-32s-29e, dry, elev. 398 ft., top hard schist 13,792 ft., TD 13,818 ft.

Kern Bluff area: Standard Oil Co. of California 41 C.C.M.O.-A, 15-29s-28e, dry, elev. 783 ft., Santa Margarita 2,256 ft., Round Mountain silt 2,577 ft., Olcese 3,730-4,292 ft., Vedder 5,720 ft., basement 7,093 ft., TD 7,124 ft.

Tejon area: Steele Petroleum Co. 2 Grizzle, 11-11n-18w, dry, elev. 1,106 ft., TD 540 ft. in granite.

Blackwells Corner area: The Superior Oil

Co. 1 Styskal, 6-27s-19e, dry, elev. 679 ft., TD 1,992 ft.

Stanislaus County, Ripon area: Tide Water Associated Oil Co. 64-7 Philbrich, 6-27s-19e, dry, elev. 50 ft., TD 5,134 ft.

Monterey County, Monterey area: Halvern L. Norris & Associates 1 Saucito, 4-16s-1e, dry, elev. 650 ft., granite 2,005 ft., TD.

Tulare County, Richgrove area: Humble Oil & Refining Co. 2 DiGiorgio, 30-24s-28e, dry, elev. 353 ft., basement 6,166 ft., TD 6,168 ft.

San Benito County, Hollister area: Hollister Oil & Gas Co. 1, 11-12s-5e, dry, TD approx. 2,500 ft.

Ventura County, Piru area: Jergins Oil Co. 1 Leavens-Goodenough, 23-4n-19w, dry, elev. 2,050 ft., TD 2,310 ft.

SOUTHWEST TEXAS

Gas-Condensate Pay Found In San Patricio County

CORPUS CHRISTI.—A new gas condensate pay zone at Crabb (formerly called Morgan) field, west of Sinton in San Patricio County, has been opened by Southern Minerals Corp. 2 Hill et al. On open flow the well gaged 10,000,000 cu. ft. of gas per day with a spray of condensate, and shut-in pressure of 2,225 psi. Production is through perforations at 6,684-88 ft.

D. G. Wood, Sr., 1 fee, wildcat test near the El Tanque field, Starr County, is preparing to test on the pump for completion. Total depth is 1,320 ft. in oil sand logged at 1,307-20 ft. The well has 600 ft. of oil in the hole and rigged up the pump after testing failed to induce a flow. The well is located in Porcion 84, 4 miles northeast of Rio Grande City.

Renwar Oil Corp. and E. E. Fogelson 1 State of Texas Tract 106, southwest extension well at Fulton Beach field, Aransas County, has been completed for 165 bbl. of oil per day through a 9/64-in. choke, with 1,060 psi. tubing and 1,100 psi. casing pressure, with no water in the flow, 38°-gravity oil with gas-oil ratio of 260. Total depth in sidetracked hole is 7,238 ft., and top of the pay zone is 7,210 ft. Production is through perforations at 7,211-16 ft.

W. H. Holland 1 Vela, wildcat test ¾ mile southwest of Boyle field, in Starr County, tested gas through perforations at 3,317-21 ft., and in new perforations at 3,068-70 ft., the well flowed gas through ¼-in. chokes with 1,100 psi. working pressure. Total depth is 3,564 ft., with the 5½-in. casing set on bottom. This well is in Porcion 91.

There were 34 new locations reported for Districts 1 and 4, of which 10 are wildcat starts, 2 each in Duval and Jim Hogg, and 1 each in Hidalgo, McMullen, Milam, Starr, Williamson, and Zapata counties. Twelve wildcats were dry, two each in Atascosa, Frio and Jim Hogg, and one each in Duval, Hidalgo, Kleberg, McMullen, Uvalde, and Zapata counties.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) WILDCAT FAILURES

Atascosa County: Herman Brown 1 Mary Stanush, D. Day Sur. 1340, 3 mi. N of Poteet, dry, TD 4,010 ft.

Kirkwood & Morgan, Inc., and Placid Oil 2 Louis Eisenhauer, Diego Perez Sur. 1194, 10 mi. N of Charlotte, dry, TD 5,467 ft.

Duval County: The Texas Co. 2 Zella C. Foster, Thomas Smithers Sur. A-492, dry, TD 5,975 ft.

Frio County: R. L. Kirkwood 1 Griffith-Williams Cattle Co., in J. M. Martinez Sur. 288, A-487, 12 mi. NW of Divot, dry, TD 4,260 ft.

Parker & McCune 1 Ruth McLean Bowman, in John Routz Sur. 8, 3 mi. SW of Charlotte field, and 2 mi. W of Atascosa line, dry, TD 5,717 ft.

Hidalgo County: Geo. W. Graham 1 Nieanor Pena, in San Jose Gr., 10 mi. NE of Cipres, 1½ mi. NE of Arrowhead field, dry, TD 7,518 ft.

Jim Hogg County: Amerada Petroleum Corp. 1 Maria G. de Gutierrez, in John Gibson Sur. 167, 10 mi. W of Hebbronville, dry, TD 4,004 ft.

Amerada Petroleum 1 A. A. Martinez, Sur. 294, 10 mi. W of Hebbronville, and 1¼ mi. W of South Armstrong field, dry, TD 4,004 ft.

Kleberg County: Humble Oil & Refining Co. P-1 King Ranch-West Laureles, in Francis M. Dimond Sur. A-90, 8 mi. SE of Kingsville, dry, TD 12,000 ft.

McMullen County: Harris-Funk Drilling Co. and Bravado Oil Co. 1 Mrs. Marie G. McCampbell, in J. M. Martin Sur. 12, 15 mi. NW of Calliham, dry, TD 6,014 ft.

Zapata County: Bridwell Oil Co. and W. C. McBride, Inc., A-6 Hinnant, in SK&K Sur. 74, dry, TD 1,763 ft.

EASTERN TEXAS

Phillips Well Completed For Discovery Third Time

DALLAS.—Phillips Petroleum Co. 1 McMinn, M. M. Long Survey, discovery well of South Tyler field in Smith County, was back in the discovery brackets this week when it completed for the third time, to add a new pay zone to the field. The well was originally drilled to 10,017 ft. in 1944 and completed for a flowing potential of 281 bbl. of around 45°-gravity oil a day from the James limestone at 9,918-29 ft. It was reentered in 1947 and completed a second time from new perforations at 9,862-72 ft., making 9 bbl. of 57°-gravity oil an hour through ¼-in. choke, with gas-oil

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ratio around 8,000 cu. ft. On the third completion, it was plugged back to 9,654 ft. and perforated in the Rodessa section at 9,550-70 ft. Initial production gaged 248.3 bbl. of 54°-gravity oil a day through ¼-in. choke on tubing, with gas-oil ratio of 11,860 cu. ft.

In Bowie County, Gulf Oil Corp. 1 John Veach, Jacob McFarland Survey, resumed drilling and was below 6,777 ft. in sand and shale, after extensive coring from 6,512-6,611 ft. Most of the recovery was sand, sandy shale and siltstone, with no shows.

In Henderson County, Stanolind Oil & Gas Co. 1 Tom & Walton Deupree, Samuel Chears Survey, was swabbing acid water with a slight show of gas from Rodessa perforations at 10,222-278 ft.

In Henderson County, Star Oil Co., Inc., 1 Gamble & Lancaster, Wm. Keese Survey, 3 miles south and slightly west of Malakoff, took side-wall cores in the Nacatoch at 1,461, 1,465, 1,468, 2,885, 2,888, and 2,891 ft. There were no shows, Total depth was 4,076 ft., in the Woodbine topped at 3,950 ft.

Humble Oil & Refining Co. 1 E. N. Rylie, Kaufman County wildcat, 4 miles southeast of Kemp, was shut down for repairs at 7,063 ft., in dense, silty lime. Cores at 7,045-63 ft. recovered 16 ft., being 4 ft. of lime, 6 ft. of slightly porous sand with brackish taste, and 6 ft. of sand with streaks of shale and mudstone. There were no shows.

Jack W. Frazier et al 1 Steubenrauch, Pedro Varella Survey, Limestone County, was drilling below 6,142 ft. in lime and shale.

Barnsdall Oil Co. 1 East-Pickering Lumber Co., new operation in the W. J. Crane Survey, 6½ miles east of Shelbyville, Shelby County, had total depth at 5,660 ft. and was preparing to drill-stem test. It had a drilling break at 5,622-24 ft. and circulated up samples which showed lime with oil stains. A 35-ft. core from 5,625-60 ft. was hard lime, being porous to fairly porous, with gas odor.

EAST TEXAS (DISTRICTS 5 & 6)
WILDCAT FAILURES

Anderson County: The Texas Co. 2 George A. Wright, James Madden Sur., 6½ mi. SW Palestine, dry, TD 3,882 ft., Midway 1,003 ft., Pecan 2,102 ft., Austin 3,205 ft., Comanche 3,558 ft., salt 3,840 ft., elev. 301 ft.

Cherokee County: W. M. Mitchell & Son 1 Whiteman-Decker, T. W. Fulgham Sur., 12 mi. W Alto, dry, TD 5,169 ft., Woodbine 5,160-69 ft.

EAST TEXAS (DISTRICTS 5 & 6)
SUCCESSFUL WILDCAT

Panola County: Bert Fields 1 J. D. Woolworth, W. B. Ashlin Sur., 5½ mi. E Elysian Fields, extension to Bethany gas area, perforated Hill zone 4,910-40 ft., flowed 10,800,000 cu. ft. daily, open flow, rock pressure 2,122 psi.; perforated Travis Peak 6,080-6,100, 6,140-50 and 6,190-6,210 ft., flowed 1,950,00 cu. ft daily, open flow, rock pressure 2,381 psi., TD 6,470 ft.

PERMIAN BASIN

Lower Permian Discovery Yields High-Gravity Oil

MIDLAND.—Lower Permian sand pay, said to be similar to the Sprayberry pay in southeast Dawson County, and yielding high-gravity sweet oil, was reported at H. L. Hunt 1-B Clayton & Johnson, Borden County wildcat. Location is 660 ft. from west and north lines of the northeast quarter, Section 22, Block 31, T6N, T&P Survey, about 10 miles northwest of the town of Gail (corrected from previous reports).

A 30-minute drill-stem test in the sand at 5,729-49 ft. brought gas to the surface in 6 minutes and recovered 630 ft. of mud-cut oil and 270 ft. of clean oil. A second test, open 95 minutes, from 5,759-59 ft. recovered 810 ft. of oil, cut with mud and salt water, plus 1,890 ft. of fluid testing up to 30 per cent oil and remainder salt water. Salt content was 130 parts per million. The 1-B Clayton & Johnson is 16 miles north of Hunt's 1 Clayton & Johnson, recent completion in the lower Permian at 6,490-6,520 ft.

In northeast Winkler County, 10 miles northwest of the Wheeler area, Gulf Oil Corp. 135-E Keystone, Section 2, Block B-1, PSL Survey, drilled another 50 ft. of pay in the Devonian to 9,744 ft. Production was assured when the well tested the top of the Devonian at 9,630-94 ft. Gas came to the surface in 15, water blanket in 20, and oil in 27 minutes. It was allowed to flow for 1 hour, gaging 119.7 bbl. of 37°-gravity oil, plus 14 bbl. of water blanket. The drill pipe unloaded four times while being pulled, and recovered an additional 540 ft. of clean oil.

Operators then drilled ahead and tested from 9,694-9,744 ft., total depth. Gas surfaced in 20, water blanket in 50, and oil in 65 minutes. During the next hour it flowed 79.3 bbl. of clean oil, with gas estimated at 1,440,000 cu. ft. daily. Electrical surveys were to be run before further testing.

In Dawson County, Seaboard Oil Co. of Delaware 2 S. E. Lee, deep test in the Sprayberry (San Andres, 3,750 ft.) was barren in the Ellenburger topped at 10,920 ft., but plugged back to complete as a new pay discovery around 6,420 ft., which apparently is the lower Permian. Initial potential was 319 bbl. of 35°-gravity oil a day, flowing through ¼-in. choke on tubing set at 6,450 ft.

Shell Oil Co., Inc., 1 Hawkins, wildcat discovery 2½ miles south and slightly west of the Robertson field in Gaines County, completed for a daily potential of 844 bbl. of oil from the Ellenburger. Some observers believe it may open a considerable area to further Ellenburger exploration. Location is in an area of Clear Fork and San Andres production and nearest Ellenburger wells are to the south and west in the Fullerton fields.

Magnolia Petroleum Co.'s 1-A TXL, Ellenburger test in northwest Upton County, recovered only acid residue with a slight gas show in swabbing down to within 4,900 ft. of bottom. Open hole was washed from 13,105-195 ft. with 250 gal. of acid, then treated with 3,000 gal. of regular acid. The section treated is below the prospective pay zone, which had not been perforated.

Magnolia's 2-11 University, 1½ miles northwest extension try to Wolfcamp production in the Shafter Lake field of Andrews County, was swabbing perforations at 8,395-8,420 ft. Previously, a 3-hour drill-stem test at 8,395-8,499 ft. recovered some 900 ft. of heavily oil and gas-cut mud.

WEST TEXAS (DISTRICTS 8 & 7-C)
SUCCESSFUL WILDCATS

Dawson County: Seaboard Oil Co. 2 S. E. Lee, Sec. 47, Blk. 34, T&P Sur., new pay in Sprayberry field, 15 mi. SE Lamesa, flowed 319 bbl. 35°-gravity oil a day, ¼-in. choke, pay 6,420-50 ft., TD 11,060 ft., PB 7,000 ft., Cisco 7,604 ft., Devonian 10,648 ft., Ellenburger 10,920 ft., elev. 2,909 ft.

Gaines County: Shell Oil Co., Inc., 1 W. L. Hawkins, Sec. 8, Blk. A-23, PSL Sur., 2½ mi. SW Robertson field, flowed 844 bbl. 40.8°-gravity oil a day, natural, 1-in. choke, Ellenburger 12,180-12,251 ft., GOR 225 cu. ft., TP 100 psi., TD 12,306 ft., PB 12,267 ft., elev. 3,346 ft.

WEST TEXAS (DISTRICTS 8 & 7-C)
WILDCAT FAILURES

Crane County: The Texas Co. 1 Richard King, Sec. 27, Blk. X, CCSD&RGNG Sur., 5 mi. NW Crane, dry, TD 3,248 ft.

Pecos County: Condor Petroleum Co. 1 State Vaughn, Sec. 42, Blk. 10, H&GN Sur., 4 mi, S Imperial, dry, TD 2,028 ft.

J. O. Griffith 1 W. H. Henderson, Sec. 50, Blk. 10, H&GN Sur., 1 mi. NE Pecos Valley LG field, dry, TD 1,599 ft.

Lassiter Drilling Co. 1 Iowa Realty Trust, Sec. 27, Blk. 10, H&GN Sur., 11 mi. SW Imperial, dry, TD 1,477 ft.

SOUTHEAST NEW MEXICO

HOBBS.—Top of the Devonian has been picked for Mid-Continent Petroleum Corp.'s 1-B U. D. Sawyer, NE NW 34-9s-36e, southwest of the Crossroad discovery, at 12,384 ft., which would place its recent successful drill-stem tests in that formation and not in the Mississippian as variously reported.

On the above test, with the tool open 2½ hours, corrected from last week's report, recovery was 4,320 ft. of clean oil, plus heavily oil and gas-cut mud and some water which operators thought was from the drilling fluid. Rate of fillup on the test was estimated at 15 bbl. of oil an hour.

On an elevation of 4,039 ft., the 1-B Sawyer had top of the Pennsylvanian at 9,580 ft., Mississippian at 11,805 ft., and top of the Devonian at 12,384 ft. The drill-stem

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test was from 12,376-12,460 ft. Placement of the packer was not reported. Operators recovered 13 ft. of dolomite and chert from 12,507-29 ft., and at last report were coring ahead below 12,601 ft.

Magnolia Petroleum Co. 1 Cox-Federal, SW SW 1-9s-36e, 4½ miles north and 1½ miles east of the Crossroad discovery, was drilling ahead below 10,455 ft. in lime and shale. Operators believed it was still in the Pennsylvanian. It is considered a separate structure from the Crossroad field and is being watched with considerable interest.

SOUTHEAST NEW MEXICO WILDCAT FAILURE

Eddy County: Magnolia Petroleum Co. 1 Golden, SE NE 29-21s-22e, dry, TD 3,907 ft., San Andres 230 ft., Glorietta 1,540 ft., Drinkard 3,150 ft., Abo 3,770 ft., elev. 4,478 ft.

ROCKY MOUNTAIN

California Co. Opens New Wyoming Area

DENVER.—Recovery of oil on a drill-stem test on the Muddy sand at The California Co.'s Borie High wildcat, the Morton-King, CE½ NW SW 13-13n-68w, Laramie County, Wyoming, indicated a new discovery in this zone. The well topped the Muddy at 8,494 ft., and the test was made between 8,483-8,563 ft., total depth. In 30 minutes the recovery was 2,200 ft. of 34°-gravity sweet oil, with 120 ft. of mud. Best saturation was reported between 8,553-63 ft. The operator is now coring below 8,592 ft. in shale, and will test the Dakota-Lakota sands prior to decision on drilling to the Tensleep, original objective of the wildcat. This well offsets on the north a deep test drilled by Amerada Petroleum Corp. and others in 1936. The Amerada well went to 9,385 ft. in the Chugwater and although small shows logged in the Muddy at 8,500 ft., the well was not considered commercial in that zone. The Sundance tested water in the first well. California reassembled this block in 1947, and following seismic work in the area made location for the present well. This wildcat is on the west side of the Denver or Julesberg Basin, where several wildcats are now drilling and others are scheduled as a result of geological and geophysical work.

Saturation was logged in a Chugwater sand at the Phillips Petroleum Co., Carter Oil Co. and Kerr-McGee Oil Industries, Inc., 1 Sheldom Dome wildcat, C NW SW 36-6n-3w (WRM), Fremont County, Wyoming. The core was recovered between 4,090-4,100 ft. in a sand near the base of the formation. Operators are coring ahead and will make drill-stem test of the zone. The only commercial production from the Chugwater has been in the Hamilton Dome field of Hot Springs County, although shows have been found in this formation in several wells. This joint operation is on a 6,500-acre unit, 4 miles northwest of the Sheldon Dome field, where Carter, Phillips and Kerr-McGee have two wells producing from the Embar and Tensleep formations.

Phillips is now preparing to make a Tensleep test of its second well in the South Cole Creek field, where a discovery in the Lakota was made recently. The present well, 2 Cole, SE SW NW 17-34n-76w, is a ¼-mile northwest extension, and drill-stem tests in the Lakota indicate the well will equal the initial production rate of the discovery well. The Lakota was topped at 8,303 ft. and the operator is preparing to drill ahead below 8,351 ft., total depth. Tensleep is expected below 10,000 ft. and has not previously been tested in the field.

General Petroleum Corp. has abandoned the 5-25-P, Freedom Dome wildcat, NW NW SW 25-16n-38e, Garfield County, Montana. The well was drilled to 9,018 ft., total depth, and topped the Cambrian at 8,070 ft. There were no shows reported.

New locations.—There were 17 new locations during the week: 9 in Wyoming, 6 in Montana, and 1 each in Utah and Colorado. The Colorado wildcat is J. G. Dyer's 1 Trindle, CW½ NW SE 30-5n-68w, in the Loveland area, Larimer County, on the west side of the Denver Basin. The well will be drilled to the Morrison at around 6,000 ft. Location has been made for the fourth well at Sussex Unit by Continental Oil Co. The well is ½ mile northwest of the recent completion, which extended the field one location west of the discovery. In Utah, Tide Water Associated made location for a wildcat in the Sweetwater Unit at the 7-25, SE NE SW 25-26s-13e, Grand County. The company is now drilling a wildcat 35 miles east of the new location, on the Big Flat Unit. Both wells are scheduled as Mississippian tests.

WYOMING WILDCAT FAILURES

Big Horn County: Gypsum Creek: J. W. Stephens et al 1 NPRR, SW NW SW 22-58n-96w, TD 1,043 ft., dry.

Crook County, Rush Creek: Gardner et al 1 fee, NE NE NW 17-49n-63w, dry, TD 1,260 ft.

Niobrara Creek, Old Woman Creek: Brown et al 1 Clark, SW SW SE 3-36n-62w, dry, TD 1,680 ft.

Sweetwater County, Lost Creek: California-Wyoming Development Co. 1 Govt., CSL SW SW 7-25n-94w, dry, TD 375 ft.

MONTANA SUCCESSFUL WILDCAT

Golden Valley County, Big Coulee Hailstone Dome: The Texas Co. 1-D NPRR, C SW SW 31-5n-20e, TD 2,070 ft., PB 2,070 ft., flowed 24,000 cu. ft. gas per day, Morrison 1,950 ft., Ellis 2,195 ft., Chugwater 2,435 ft., Amsden 2,485 ft., Madison 3,350 ft., Cambrian 4,548 ft., elev. 3,754 ft., GR.

OHIO, KENTUCKY

Bladensburg Pool Gets Good Extension

COLUMBUS.—The best oil well of the week was the Mid East Oil Co. 4 C. M. Darling, Section 14, Jackson Township, Knox County, a south extension to the Bladensburg pool. The Clinton sand at 2,912-66 ft. made 184,000 cu. ft. of gas and 15 bbl. of oil natural, and flowed 134 bbl. of oil in 24 hours after shot.

In Perry County, Mid East's 3 J. R. Underwood, Section 34, Hopewell Township, extended the Baker pool one location to the north with a good well. The Clinton at 3,936-70 ft. made an estimated 125 bbl. of oil the first day after shot. In Pleasant Township, the Bradford Oil Co. 1 N. R. Vincent, Section 21, showed 281,000 cu. ft. of gas in the Medina at 3,832-38 ft. and 521,000 cu. ft. when shut in 12 hours after shot.

A wildcat gas well, west of the town of Wellington, was brought in by G. B. Harmon et al on the Lorain County Agricultural Society property, Lot 34, Wellington Township, Lorain County. The Clinton stray at 2,252-54 ft. gaged 100,000 cu. ft. of gas and at 2,286-91 ft. made 507,000 cu. ft. The well will probably be tubed natural.

Benedum-Trees 1 Eichenberg, Lot 30, Mayfield Township, Cuyahoga County, is being drilled on down and will test the sub-Trenton.

Bad field conditions caused new locations to drop to 11 from 7 counties: Ashland having 3, Noble and Muskingum 2 each. Cambridge and Mt. Vernon fields led in completions with six each.

OHIO WILDCAT FAILURE

Stark County, Osnaburg Township: East Ohio Gas Co. 1 Andrew Almasy, Sec. 32, Clinton 4,871-4,965 ft., dry, TD 5,077 ft.

EASTERN KENTUCKY

ASHLAND.—In Furnace gas field of Estill and Powell counties, Petroleum Exploration Co. has the latest completion in 1 Walter Shouse, 21-P-68. St. Peter sand topped at 2,473 ft. gaged 3,717,000 cu. ft. of gas daily to total depth of 2,504 ft. Two other wells are now drilling one of which is Petroleum Exploration 1 Hobart Tipton and the other South Central Petroleum Corp. 3A Garrett on the discovery lease of the field.

In Morgan County, 12-P-65, Sam Allen et al 1 Thomas Richardson is still shut down at 4,447 ft. in the Knox dolomite pending decision to drill deeper and test lower sands.

EASTERN KENTUCKY WILDCAT FAILURE

Estill County: A. H. Carpenter 1 Pete Wells, dry, TD 3,200 ft., Corniferous 125, Tyrone 2,48 ft., St. Peter 1,928 ft., water, Knox 1,978 ft.

WESTERN KENTUCKY

OWENSBORO.—Gulf Oil Corp. has a prospective addition to North Euterpe pool in Henderson County. Gulf 1 A. Y. Keach, 1-O-25, southeast of the discovery well, is going on pump to test the Hardinsburg at 1,701-17 ft. The well is reported to have swabbed oil while cleaning out. North Euterpe pool was opened in November by Ashland Oil & Refining Co. and Basin Drilling Co. 1 Crafton, NW SE SE 1-O-25, with an initial production of 50 bbl. from the Hardinsburg at 1,728-47 ft.

J. C. Ellis completed three more oil wells and one dry hole in the area north of Griffiths pool in Daviess County. The oil wells, Ellis 12, 13, and 14 Berry, were completed in the Palestine for 20 bbl., 50 bbl., and 70 bbl. respectively. There are about 12 other wells drilling in the area, mostly in Sections 4, 5, and 7 of P-28.

In McLean County, Hedges & Hodges 1

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J. W. Taylor, SE NE NW 21-M-29, northeast of Livermore, is going on pump to test the Cypress at 1,100-08 ft.

In December of last year, Failetti & Turner had a good Cypress extension east of Uniontown pool at 1 Randolph, 17-P-20. The same operators are moving in cable tools to test the Cypress at 1 Pleasant, one location south of the Randolph well which made 50 bbl. per day.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Henderson County: Sohio Petroleum Co. and Chester Oil Co. 1 Shiver heirs, SW SE NW 1-O-26, IP 65 bbl., Benoist 1,820-28 ft., TD 1,829 ft. (Discovery well for Curdsville, West).

INDIANA

EVANSVILLE.—Henry P. Smith has added two Devonian wells in Spring Hill pool in Vigo County. Smith 2 Fee, SE SE SE 10-11n-9w, a northwest offset to the discovery well, was completed in the Devonian at 1,698-1,701 ft. and 1,711-17 ft. with an initial production of 84 bbl. per day. Smith 3 Fee, C E½ E½ NE 15-11n-9w, was completed for 72 bbl. per day from the Devonian at 1,678-1,703 ft. Spring Hill pool was opened in November by C. B. Mansfield 1 Sutliff, NW NW NW 14-11n-9w, for 200 bbl. per day from the Devonian at 1,670-1,702 ft.

Coy Oil Co. has set casing at 1 C. Shirley et al, SE SE NW 21-2n-7w, for another attempt at Rosiclare production in the area south of Washington. The same operator had a show of oil at 1 Wildman, SE SW SE 21-2n-7w, but failed to make a commercial oil well.

In Gibson County, Superior Oil Co. has set casing at 1 Joseph Kolb, NW SE SW 22-1s-10w, and will test the McClosky through perforations at 1,874-78 ft. The same operator has set surface pipe at 1 Samuel J. Kolb, NW SW SE of the same section.

F. B. Cline is finding evidence of possible Devonian production on the east side of the abandoned Riley pool in Vigo County. Cline 1 Donham et al, NE NW SW 24-11n-8w, is pump testing the Devonian through perforations at 1,641-45 ft. The well is reported to be making about 15 bbl. of oil and 200 bbl. of water per hour. Cline 1 Sylvia Jefferies, NW NE SW 24-11n-8w, is cleaning out to test the Devonian at 1,637-53 ft. and 1,665-69 ft.

INDIANA WILDCAT FAILURES

Knox County: Peter Gerasimos 1 McCormick, NE SE NW 26-2n-10w, dry, TD 1,705 ft.

Posey County: Ashland Oil & Refining Co. et al 1 R. E. Sawyer, C E½ NW NE 4-5s-12w, dry, TD 2,882 ft.

Sullivan County: A. J. Slagter, Jr. 1 H. Edwards, SE NE SW 19-8n-10w, dry, TD 2,833 ft.

Vanderburgh County: Ashland Oil & Refining Co. et al 1 F. H. Tilford, NE SW SW 18-7s-11w, dry, TD 2,737 ft.

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APPALACHIAN FIELD

United Gets Good Gas Well In Lincoln County W. Va.

PITTSBURGH.—In Shade Township, Somerset County, Pennsylvania, Peoples Natural Gas Co. 1-3725 R. F. Grove, elevation 2,343 ft., will be plugged and abandoned. This wildcat had a show of gas at 9,323 ft. In Cherry Township, Butler County, Hill Oil & Gas Co. 1 Joseph Duffy, elevation 1,203 ft., drilled through the Oriskany sand to a total depth of 4,889 ft., was reported dry.

New locations reported in Pennsylvania were four: Red Bank Township, Clarion County; Union Township, Jefferson County; and in Salem and Unity townships, Westmoreland County.

In Beaver Pond district, Mercer County, West Virginia, United Fuel Gas Co. 6478 A. W. Hicks, which encountered a fishing job at 621 ft., has been abandoned at this depth and the rig skidded a short distance to a new location. In Portland district, Preston County, Nollem Oil & Gas Co.-Snee & Eberly et al are drilling in a wildcat well, 1 Hugh R. and James A. Fitzpatrick, elevation 2,228 ft. Drilling is at 1,200 ft., after running the 8-in. casing ot a depth of 1,098 ft. It is located on the Kingwood Quadrangle 4.20 miles south of Lat. 39°, 30′, 4.20 miles west of Long. 79°, 30′, and approximately ¾ mile west of the Cora Lewis 1 well drilled by Snee et al. In Kingwood district, Hope Natural Gas Co. 9209 Frank Barlow, elevation 2,235 ft., revised the top of the chert to 8,004 ft.; encountered a show of gas at 8,090 ft., and is drilling at 8,092 ft. In Harts Creek district, Lincoln County, United Fuel Gas Co. 1-6470 fee, was reported as a good gas well, gaging 1,245,000 cu. ft. after acidizing in the Big lime; total depth 1,476 ft.

New locations reported in West Virginia were 17: Sheridan district, Calhoun County; Ravenswood and Union districts, Jackson County; Elk district, Kanawha County; Hackers Creek district, Lewis County; Harts Creek district, Lincoln County; Logan district, Logan County; Union district, Marion County; Browns Creek district, McDowell County; Grant district, Monongalia County; Portland district, Preston County; Clay district, Ritchie County; Lincoln district, Wayne County; and Oceana district, Wyoming County.

PENNSYLVANIA WILDCAT FAILURE

Somerset County: In Shade Township, Peoples Natural Gas Co., 1-3725 R. F. Grove, dry with a show of gas. Tully lime 7,800-65 ft., Onondaga chert 8,950 ft., Oriskany sand 9,126-65 ft. Salt water 9,225 ft. Show of gas 9,323-24 ft. Total depth 9,369 ft.

N. CENTRAL TEXAS

Jones County Well Will Complete in Hope Section

WICHITA FALLS.—Roark & Hooker and West Central Drilling Co. 1 Alec Carter, Section 53, Block 18, T&P Survey, 1 mile north of Noodle in Jones County, has canceled plans for drilling to 5,000 ft. to test the Strawn and will try for completion in the upper Hope section. Drilling stopped at 3,030 ft. and casing cemented at 2,900 ft. Completion was to be made from perforations at 2,772-78 ft. A drill-stem test of that interval recovered 1,800 ft. of free oil in 2 hours, under flowing pressure of 400 psi. Additional oil shows were reported from 2,801-07 ft.

Southeast of Sagerton, in Haskell County, Pan American Production Co. completed 1 W. G. Wendeborn, A. F. Burchard Survey, for 68 bbl. of 40°-gravity oil in 20 hours, on the pump. Perforations were in the Strawn sand at 4,772-80 ft. Pan America's 1 Austin, southeast offset to the discovery, found the Strawn dry and was drilling ahead below 4,845 ft.

In Throckmorton County, 9 miles south of Throckmorton, Fred M. Manning, Inc., 1 Brown-Condron-Davis, on the line between Blocks 1627 and 1628, TE&L Survey, recovered 205 ft. of heavily oil-cut mud, 60 ft. of salty mud-cut oil and 30 ft. of salt water on a 1-hour drill-stem test of the Caddo at 4,134-54 ft. The well is a ½-mile east offset to the Condron-Davis Mississippi discovery, and only producer in the field. Drilling continued below 4,430 ft. at the new well.

In the new area 2 miles southwest of Murray, Young County, Warren Oil Corp. 2 Hamilton, Block 1661, TE&L Survey, drilled sand with oil shows from 2,859-65 ft. A 40-minute drill-stem test of the interval brought gas to the surface in 6 minutes, and oil in 40 minutes. Recovery was 15 bbl. of oil, 2 bbl. of oil-cut drilling mud, plus some salty water. Additional pay was logged from 2,902-05 ft., total depth. Seven-inch casing was set to 2,903 ft. for completion.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) SUCCESSFUL WILDCATS

Callahan County: Skelly Oil Co. 1 Myrtle Wilson, Lot 1, Lge. 6, Lawace CSL, 3 mi. NE Cottonwood, perforated 3,700-12 ft. (Pennsylvanian?), flowed 2,240,000 cu. ft. gas, CP 660 psi., TP 590 psi., TD 4,025 ft., PB 3,890 ft., elev. 1,858 ft.

Clay County: Gulf Oil Corp. 1 George Scaling "A," Sec. 19, H&TB Sur., 6 mi. W Joy, flowed 311.9 bbl. 42°-gravity oil in 6 hours, ¾-in. choke, CP 500 psi., TP 300 psi., GOR 785 cu. ft., TD 6,195 ft., PB 5,715 ft.

S. D. Johnson 1 Bertha Miller, Lot 5, Blk. 11, Clark & Plumb Subd., 3 mi. SW Halsell, flowed 65.8 bbl. 44.5°-gravity oil in 3½ hours, 12/64-in. choke, Caddo 5,380-91 ft., CP 520 psi., TP 650 psi.

Montague County: Kingery Bros. 1 A. Durham, Thomas Puckett Sur., A-595, 6 mi. NE St. Jo, pumped 35 bbl. oil, some water, nitro shot 1,865-70 ft., TD.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) WILDCAT FAILURES

Callahan County: A. G. Hill 1 Hansly Heirs "A," Sec. 24, ETRR Sur., 6 mi. N Baird, dry, TD 4,667 ft., Flippen 1,195 ft., Palo Pinto 2,580 ft., gas sand 4,310-40 ft., Chappel lime 4,490-4,500 ft., Ellenburger 4,500 ft., dolomite 4,615 ft., elev. 1,678 ft.

Clay County: L. T. Burns 1 Dale Estate, Sec. 2683, TE&L Sur., 2 mi. NW Shannon, dry, TD 5,282 ft., Caddo 5,174-5,250 ft., DST recovered 300 ft. clean oil, pipe dropped and collapsed when run.

Coleman County: L. A. Hedrick and A. R. Dillard 1 Ozro Eubanks, Sec. 665, Blk. 5, Jonathan Scott Sur., 1½ mi. NW Santa Anna, dry, TD 1,919 ft., sand with oil odor 1,831 ft.

Comanche County: J. J. Lynn 1 T. H. Jack-

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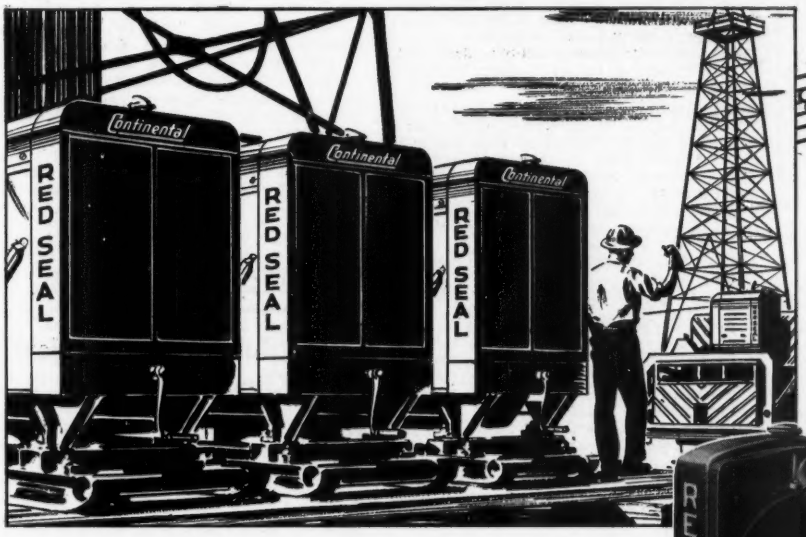

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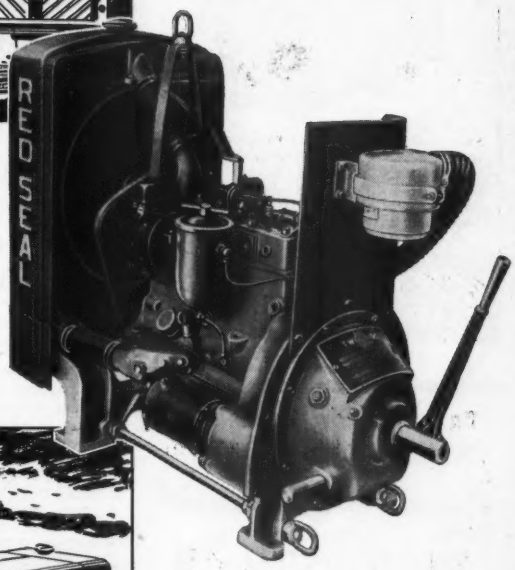

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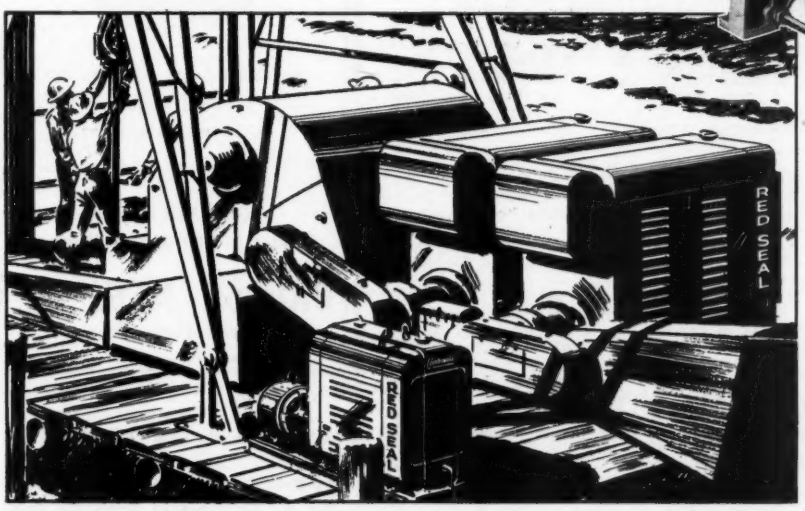

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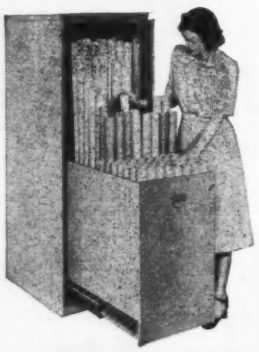

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son, Sec. 83, Lampasses CSL, 3 mi. S Sipe Springs, dry, TD 3,117 ft., Ellenburger 3,088 ft., elev. 1,496 ft.

Eastland County: Combined Oil Co. 1 W. A. Hull, Sec. 100, Blk. 3, H&TC Sur., 7 mi. SW Cisco, dry, TD 4,042 ft., Caddo 2,810 ft., Marble Falls 3,298 ft., Ellenburger 3,880 ft., elev. 1,636 ft.

West Bros. 1 Clarence Pippin, Sec. 3170, TE&T Sur., 1 mi. N Dothen, dry, TD 700 ft.

Fisher County: J. D. Hancock and P. G. Lake, Inc., 1 W. C. Young, J. S. Davis Sur., 1 mi. NE Sylvester, dry, TD 3,804 ft., Flippen 3,275 ft., Noodle Creek 3,017 ft., Swastika 3,725 ft., elev. 1,880 ft.

Jones County: Ungren & Frazier 1 C. R. Wilson, Sec. 13, Blk. 2, SPRR Sur., 2½ mi. S Anson, dry, TD 4,562 ft., Valera 1,130 ft., Flippen sand 2,362 ft., lime 2,375 ft., Dotham 1,983 ft., Hope 2,515 ft., elev. 1,815 ft.

Montague County: S. D. Johnson et al 1 J. H. Conyers, Thomas Puckett Sur., A-595, 6 mi. N St. Jo, dry, TD 3,672 ft.

Nolan County: American Trading & Production Co. 1 H. W. Peckham, Sec. 37, Blk. 20, T&P Sur., 3 mi. SW Trent, dry, TD 5,885 ft., Noodle Creek 2,830 ft., Dotham 2,730 ft., Ellenburger 5,690 ft., dolomite 5,716 ft., elev. 2,018 ft.

Stephens County: Texas Pacific Coal & Oil Co. 1 H. A. Bufkin, W. H. Clark Sur., 2 mi. NE Crystal Falls, dry, TD 4,614 ft., Caddo 3,417 ft., Mississippian 4,442 ft., Ellenburger 4,557 ft.

MICHIGAN

New Trent Pool Holds Interest

MOUNT PLEASANT.—Follow-up drilling in the new Trent pool, Casnovia Township, Muskegon County, continued to demand the center of interest in Michigan as Rex Oil & Gas Co. 3 Herman, NW SW NE 19-10n-13w, located nearly ½ mile northwest of the area's Traverse discovery producer, showed 75 ft. of free oil natural overnight from a Traverse pay logged between 2,038-40 ft. This show was acidized earlier in the week and pumping equipment was being set for test. Well was bottomed out at 2,049 ft., 11 ft. in the lime, and no indication of salt water was present at that depth.

Augie Busk 1 Herman, SE NW NE 19-10n-13w, direct 20-acre offset to the Rex test well, was set for completion in the Traverse after 5-in. casing had been cemented at 2,015 ft. The Busk well was reported to be about 9 ft. higher on the Antrim shale base, best marker above the objective Traverse.

P.K. Degenther 1 Herman, SE SE NE 19-10n-13w, was reported to be flowing at an average of 100 bbl. of oil a day with a 3 per cent water cut showing at that production rate, less water than had been reported when well was produced at a greater flow-rate.

The lack of a bottom-hole water show in the Rex 3 Herman and the decline in water cut from the discovery gave some hope that the source of the water was showing in the Degenther 1 Herman might not have its source from the producing formation.

At a public hearing, the Michigan Supervisor of Wells and the State Oil Advisory Board in Lansing, announced cut-backs in proration allowables for wells in the Coldwater Dundee oil field, Isabella County, and the Pentwater Dundee field, Mason and Oceana counties. Coldwater well will be cut from a present allowable of 125 bbl. a day to 75 bbl., while Pentwater Dundee horizon producers will be cut from 100 bbl. a day to 50 bbl., effective Feburary 7.

MICHIGAN SUCCESSFUL WILDCAT

Ogemaw County, Logan Township: Sun Oil Co. 1 T. Prescott et al, NW SE NW 25-22n-4e, 560,000 cu. ft. gas from Coldwater stray sand, TD 3,129 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Hopkins Township: Stanley L. Findley 1 Raymer, SE NE NE 24-3n-12w, dry in Traverse, TD 1,775 ft.

Valley Township: Eric P. Schelling 1 Northrup-Van Buren, SE SE NE 2-2n-14w, dry in Traverse, TD 1,564 ft.

Isabella County, Rolland Township: Pure Oil Co. 1 Wyant, SE SE NE 1-13n-6w, dry in Marshall, TD 1,668 ft.

Ottawa County, Georgetown Township: John R. Atha 1 Amelia, NW SE SE 21-6n-13w, dry in Traverse, TD 1,763 ft.

Roscommon County, Nester Township: Ohio Oil Co. 1 Halestro Reserve Inc., SW SW SW 5-21n-1w, dry in Monroe, TD 3,983 ft.

SOUTH LOUISIANA

Union Sulphur Opens New Deep Gas Production

NEW ORLEANS.—New deep gas production in the Arnaudville area of St. Martin Parish is being opened at The Union Sulphur Co., Inc., 1 Hefea Land Co., 38-8s-5e. Drilled to a depth of 11,085 ft., with 7-in. casing cemented to 11,085 ft., perforations were made from 11,076-78 ft., for the initial production test. The flow through a ½-in. choke was 37 bbl. of condensate per day along with 2,500,000 cu. ft. of gas. Flowing pressure on tubing was 3,800 psi.,

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gas-oil ratio 67,500. Operators are continuing to test in the 11,000-ft. sands.

Superior Oil Co. 4 LL&E-Unit 12, 24-21s-16e, deep test on the northeast flank of Four Isle dome in Terrebonne Parish, is reported to have gas sands from 11,908-22 ft. Operators drilled to a total depth of 14,564 ft. and pulled out to run log. The hole heaved and filled up to around 14,000 ft. It was cleaned out to 14,500 ft. and liner is being run to that depth. A string of 7-5/7-in. protection pipe was cemented to a depth of 13,505 ft. Operators are preparing to test.

Danciger Oil & Refining Co. 1 Myrtle E. Smiley, a wildcat exploration north of Springville, in Livingston Parish, is reported testing oil. This wildcat is in Section 9-7s-5e, approximately 2 miles northerly from Springville. Total depth is 8,748 ft., with 7-in. casing cemented to 8,563 ft. Test was made through perforations at 8,273-80 ft., recovery not reported as yet.

Magnolia Petroleum Co. C-4 Lutcher, a deep test in the northeast extension area of East Mud Lake field, Cameron Parish, Section 24-14s-11w, recovered 750 ft. of oil, 5,000 ft. of salt water, on a test through perforations at 11,320-11,326 ft. Operators squeezed off this section and will test further. Total depth is 11,460 ft.

Seventeen new locations were reported this week, two being wildcat starts, one each in Acadia and Lafourche parishes.

OKLAHOMA

Beckham County Well Testing for Best Zone

THE Elk City area of Beckham County continues in the spotlight with production tests under way in Shell Oil Co. 1 Long, C NE SW 15-10n-10w, a mile west of the discovery well. Drilled to a total depth of 10,500 ft., and with 7-in. casing at 9,892 ft., the well has plug set at 9,132 ft. and currently is testing through casing perforations at 9,040-80 ft. The zone being tested is one of four giving promise of oil or gas-distillate production in drill-stem tests made during the drilling of the well. The well will be the third for the field. The discovery well, also drilled by Shell and completed in November 1947, produces gas and distillate from a zone at 9,260-9,360 ft. The second well, Union Producing 1 G. G. Music, 2 miles southeast of the discovery well, is a gas-distillate producer in a zone at 9,649-62 ft.

Two additional wells, both of which have found various potentially productive zones, are near contract depth objectives and are expected to run casing shortly in preparation for production tests. Shell Oil Co. 1 Kelly, C NE SW 23-10n-21w, a mile south of the discovery well, at latest report was drilling at 10,447 ft. after a drill-stem test at 10,100-90 ft., where it flowed at the rate of 1,290 bbl. of 57° A.P.I. gravity distillate daily. Union Producing Co. 1-A G. G. Music, C NE SW 24-10n-21w, 1½ miles southeast of the discovery well and a mile north of the same company's 1 Music distillate well, was drilling at 10,440 ft.

Shell Oil Co. 1 G. W. McKenzie, C NE SW 9-10n-21w, 2 miles northwest of 1 Long, the well now testing, is drilling below 3,000 ft. Shell has let contract for drilling 1-B Walters, C SE SE 15-10n-21w, another outpost, ½ mile southeast of 1 Long.

Davon Oil Co. 1 Lee Layton, SE SW SE 36-3n-3w, is another extension for the new Panther Creek-Southwest Antioch area, Garvin County. With casing perforated at 7,306-48 ft., it flowed 115 bbl. of distillate and 2,800,000 cu. ft. of gas in 24 hours through ½-in. tubing choke. Tubing pressure was 900 psi. Continental Oil Co. 2 Rose-Vose, SE NE NW 3-2n-3w, southwest of the Davon well and another key well, flowed an estimated 7 bbl. an hour on a 48-minute drill-stem test of an interval at 8,103-58 ft. Approximately 1,580 ft. of oil and 180 ft. of oil-cut mud was recovered when tool was pulled.

The Southeast New Hope pool, in Garvin County, was extended another 40-acre location southward by Sinclair Prairie Oil Co. 1 Neill Unit, C SW NW 15-4n-3w, which flowed 561 bbl. of 42.3° A.P.I. gravity oil and 546,000 cu. ft. of gas in 24 hours through ½-in. choke through 112 casing perforations at 6,866-94 ft., recording 125 psi. pressure on the tubing and 720 psi. on the casing. The hole was drilled to 7,000 ft. and plugged back to 6,900 ft.

Gulf Oil Corp. 3 Ollie Joy, NW SE NE 30-13n-2w, Witcher pool, Oklahoma County, flowed 189 bbl. of oil with 1,837,480 cu. ft. of gas in a 21-hour production test through 25/64-in. choke from open hope at 6,191-6,200 ft. Tubing and casing pressures were 575 psi. and 275 psi., respectively.

Derby Oil Co. et al recovered 250 ft. of oil-cut mud in a drill-stem test in 1 Bailey, a rank wildcat test in NW SE NE 9-8n-2e, Pottawatomie County. Formation tested was the Hunton lime in an interval at 5,210-20 ft. Hole is being drilled deeper. Top of the Hunton was 5,155 ft. Stains and odors of oil were found at 5,170 ft.

OKLAHOMA SUCCESSFUL WILDCATS

Caddo County: Extension to North Cement —Magnlia 2 No. Cement Unit, C NW SW 13-6n-9w, flowed 85 bbl. of 46°-gravity oil per day from Marchand sand at 10,668-10,835 ft., TD 10,900 ft.

Lincoln County: Huber 1 Bartosh, NE NE NW 30-12n-6e, pumped 50 bbl. of 19°-gravity oil per day from Wilcox at 4,701-11 ft., TD.

Foster 1 Deacon, NE NE SW 25-17n-5e, pumped 45 bbl. of 40.6°-gravity oil per day from Bartlesville at 3,414-30 ft., TD.

Major County: New pay in Ringwood—Manning 1 Smith, NE NE SW 34-22n-10w, flowed 70 bbl. of oil per day from Manning at 6,796-6,836 ft., TD 6,852 ft.

Payne County: Texas Co. 1 School Land "J," NE NE NE 36-19n-3e, flowed 118 bbl. of 39°-gravity oil per day from Red Fork at 3,754-67 ft., TD.

OKLAHOMA WILDCAT FAILURES

Carter County: Seaboard 1 Smith Estate, SE SE SW 19-2s-1e, dry, TD 5,043 ft.

Creek County: Deardorf 1 Monday Bean, SW SE SE 10-18n-7e, dry, TD 3,267 ft., lower Skinner sand 2,704-10 ft., Red Fork 2,818-50 ft., Inola 2,903 ft., Bartlesville 2,924-3,020 ft., sand 2,967 ft., Mississippi lime 3,188 ft.

Garvin County: Burdell 1 Brashears, NW NW NE 30-3n-3e, dry, TD 3,010 ft., Belle City 1,770 ft., basal Pennsylvanian-Viola 1,846 ft., Trenton-Viola 1,862 ft., bromide 2,220 ft., McLish 2,536-2,808 ft.

Grady County: Westcott 1 Thomas, NE SE NE 9-5n-7w, dry, TD 2,410 ft.

Harmon County: McCasland 1 Jameson, NE SW NW 3-5n-25w, dry, TD 4,737 ft., Panhandle Big lime 2,600-2,840 ft., Pontotoc 2,840 ft.

Hughes County: Ashland 1 Williams B, SW NW NW 34-6n-8e, dry, TD 3,164 ft., Gilcrease 2,932 ft., first sand zone 2,996 ft.

Murray County: Carlock 1 Lampe, SE NW SE 19-2n-3e, dry, TD 2,417 ft., lime 2,053-86 ft., 2,226-48 ft. and 2,393-2,407 ft., no shows.

Pottawatomie County: Smith Bros. 1 Stanley, NW NW SW 26-8n-2e, dry, TD 5,846 ft.

Stephens County: Magnolia 1 Lee, NE NW NW 21-1n-4w, dry, TD 7,506 ft., Tussy lime 5,285 ft., Springer 5,767 ft., sand 5,806 ft. and 6,065 ft., first Simpson 6,797 ft., second Simpson 6,871 ft., sand 7,088 ft., Goodwin sand 7,392 ft.

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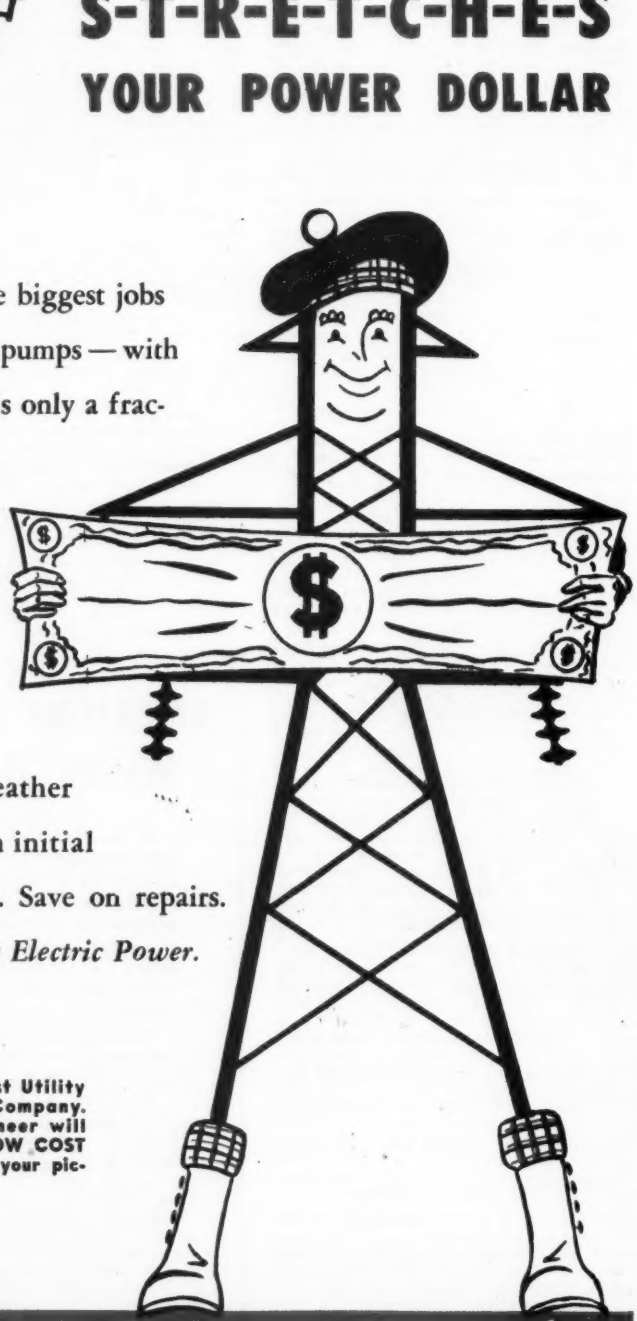

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ILLINOIS

Wabash County Gets Extension Well

MATTOON.—Calvert & Willis, Matuska Oil Co., and Central Pipe Line have a good prospective oil well at 1 J. W. Reisinger, SE NE NE 4-2s-13w, about ½ mile southwest of Maud pool in Wabash County. A drill-stem test of the Cypress at 2,401-12 ft. had gas in 40 minutes and clean oil flowing in 75 minutes. Bottom-hole pressure was 1,100 psi. This well is about 2½ miles northwest of Rochester pool that was opened last year in Indiana but was extended across the river into Illinois.

Plans for further development of North Assumption pool in Christian County continue as locations for new tests were announced to bring the total locations and drilling for the area up to 15 spots. Wells are being completed in the Rosiclare at a little less than 1,200 ft. and in the Devonian at about 2,300 ft. The pool was opened late last year. Operators completed 2 Devonian wells last week.

The Clay County wildcat, Russell Johnson et al 1 Pearce-Weiler, SW SW SW 19-3n-8e, just southwest of Clay City, is cleaning out and testing the O'Hara at 3,016-19 ft. The well is reported to have swabbed 8½ bbl. of oil per hour after treatment with 2,000 gal. of acid.

The south edge of East Inman pool has a good oil well at Dee Miller Drilling Co. 3 Charles Johnson, SW NW SW 22-8s-10e, Gallatin County. The well was completed in the Waltersburg at 1,992-2,002 ft. with an initial production of 310 bbl. per day.

ILLINOIS WILDCAT FAILURES

Christian County: Bridge Oil Co. 1-A Yackey, NE SW NW 36-15n-2w, dry, TD 2,000 ft.

Marion County: J. L. Black 1 E. Butts, C S½ SW SW 25-4n-4e, dry, TD 2,740 ft.

Wayne County: Phillips Petroleum Co. 1 Musgrave, NW NW SW 29-2n-7e, dry, TD 3,250 ft.

KANSAS

Pratt County Wildcat Opens New Field

DEEP ROCK OIL CO. 1 Young, SW SW NW 1-26-14w, Pratt County, discovery well of Moore field, has been given a permanent pumping potential of 37 bbl. daily. Production is from the Simpson sand with total depth at 4,391 ft.

Heathman-Honaker 1 Hayden, NE NE SE 31-8-19w, Rooks County, discovery well of Hayden field, has been given a similar potential rating of 122 bbl. of oil per day from the Arbuckle lime at 3,513-16 ft.

W. P. Faulkner et al 1 Gates, NW NW NW 3-22-13w, a mile south of Gates pool, and the same distance southeast of Hufford pool, is swabbing 1 bbl. of oil per hour from the Arbuckle lime, topped at 3,748 ft. Total depth is 3,756 ft.

Three-quarters of a mile northeast of Trapp pool, Ed H. Adair has run casing in 1-A Pfeister, SW SE NW 24-15-13w, southern Russell County, to test showings encountered in the Kansas City Lime and the Arbuckle. Bottom is at 3,315 ft., 2 ft. in the Arbuckle, where casing was set. The Lansing-Kansas City was topped at 3,032 ft. Oil showings were logged at 3,110-36 ft. Dry holes have been drilled between the new well and the Trapp pool.

KANSAS SUCCESSFUL WILDCATS

Butler County: Parsely new pool opener—Rex & Morris 1 Parsely, NW SE SE 3-26s-3e, pumped 45 bbl. of 48°-gravity oil per day from Mississippian at 2,695-2,704 ft.; Lansing 1,955 ft., Kansas City 2,235 ft., TD 2,704 ft.

Graham County: Morlan new pool opener—Derby Oil Co. and Peel 1 Lewis, NE NE NW 23-10s-21w, pumped 159 bbl. of 30°-gravity oil per day from Arbuckle at 3,778-84 ft.; Heebner 3,429 ft., Lansing 3,469 ft., basal Kansas City 3,700 ft., Arbuckle 3,777 ft., TD 3,784 ft.

Pratt County: Moore new pool opener—Deep Rock and Rine Drilling Co. 1 Young, SW SW NW 1-26s-14w, pumped 40 bbl. of 37.3°-gravity oil per day from Simpson at 4,348-70 ft.; anhydrite 830 ft., Lansing 3,778 ft., conglomerate 4,210 ft., Kinderhook 4,237 ft., Viola 4,290 ft., Arbuckle 4,418 ft., TD 4,455 ft.

KANSAS WILDCAT FAILURES

Barton County: Alpine Oil & Royalty Co. et al 1 Frederick, SW SW NW 12-16s-13w, dry, TD 3,433 ft., anhydrite 755 ft., Topeka 2,791 ft., Heebner 3,026 ft., Lansing 3,112 ft., conglomerate 3,381 ft., Arbuckle 3,383 ft.

H. P. Parker Syndicate 1 Soden, SW NE SW 3-19s-13w, dry, TD 3,481 ft., anhydrite 775 ft., Topeka 2,845 ft., Lansing 3,194 ft., conglomerate 3,431 ft., Arbuckle 3,438 ft.

Elreco et al 1 Tuggle, NE NE SE 21-20s-14w, dry, TD 3,576 ft., anhydrite 840 ft., Heebner 3,185 ft., Lansing 3,298 ft., Arbuckle 3,566 ft.

Butler County: E. H. Adair 3 Corbett, C N/2 N/2 N/2 26-29s-5e, dry, TD 2,865 ft., Kansas City 2,180 ft., sandy shale 2,780 ft., sand 2,807 ft.

Ellis County: Virginia Drilling Co. 1 Krueger, SW SW SE 23-13s-19w, dry, TD 3,750 ft., anhydrite 1,337 ft., Heebner 3,326 ft., Dodge 3,347 ft., Lansing 3,696 ft.

Nemaha County: Carter Oil Co. 1 Gilbert-Land Bank, NW NW SE 14-2s-14e, dry, TD 3,229 ft., Howard 902 ft., Topeka 941 ft., Heebner 1,203 ft., Lansing 1,350 ft., Marmaton 1,682 ft., Mississippian

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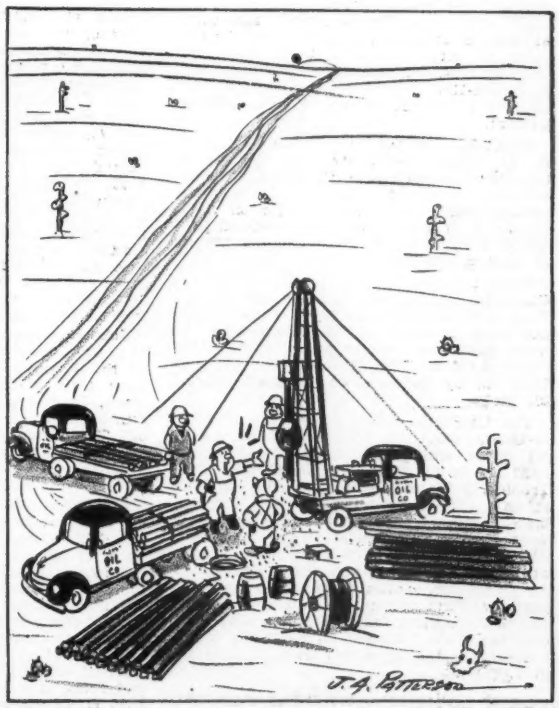

THE OIL AND GAS JOURNAL

"Me? I thought I told one of you guys to bring th' drill bits!"

7,624 ft., Kinderhook 2,806 ft., Silurian 3,102 ft.

Rooks County: Nadel & Gussman 1 Stithem, NE NE NE 14-10s-20w, dry, TD 3,852 ft., Heebner 3,432 ft., Lansing 3,472 ft., conglomerate 3,717 ft., reworked Arbuckle 3,778 ft.

Sedgwick County: Birmingham & Bartlett et al 1 Woulfe, NE NE NE 12-25s-1e, dry, TD 3,056 ft., Lansing 2,298 ft., Burgess sand 2,976 ft., Mississippian 3,026 ft.

Stafford County: J. M. Huber Corp. et al 1 Bartlett, NE NE SW 3-24s12w, dry, TD 4,048 ft., Lansing 3,445 ft., Viola 3,830 ft., conglomerate 3,780 ft., Simpson 3,948 ft., Arbuckle 3,998 ft.

LA.-ARK.

Southwest Gas Will Plug Back to Vaughn Distillate

SHREVEPORT.—Southwest Gas Producing Co. 1 W. I. Burgess, deep wildcat 1 mile southeast of Pettit and Cotton Valley production in the Lisbon field, Lincoln Parish, prepared to plug back to the Vaughn section of the Cotton Valley after recovering only slight shows near its total depth of 9,158 ft. A test of perforations at 8,780-8,800 ft. had no recovery. The packer stuck after 2 hours and had to be freed by reverse circulation. Apparently no other test was made of that interval. A drill-stem test on perforations at 9,073-9,115 ft., using ¼-in. chokes and 750 ft. of water cushion, open 45 minutes, recovered the water plus 810 ft. of gas-cut mud. Operators then prepared to plug back to the Vaugn which showed some porosity with gas distillate odor and taste at 8,695-8,713 ft. Top of the Vaughn was logged at 8,682 ft.

At this report, exploratory and field drilling had been curtailed due to cold weather. Among those wells reporting activity were: Barnsdall Oil Co. 1 Ardis & Co., 27-22n-11w, Bossier Parish Cotton Valley test; drilling below 5,783 ft. in the Rodessa. Cores from 5,247-5,339 ft. recovered shale and lime with no shows, and cores at 5,481-99 ft. yielded oolitic lime having some porosity, and salty taste. D. E. M. Oil Co. 1 N. W. Sentell, new Paluxy test in 30-22n-13w, was shut down for repairs at 2,816 ft. in the Paluxy. It is a 3,000-ft. wildcat.

In Caddo Parish, The Chicago Corp. 1 A. M. Allen, 15-22n-15w, was drilling in the Glen Rose at 3,356 ft. Cores at 2,690-2,700 ft. recovered shale and white, fine-grained sand with distillate odor on fresh breaks. A drill-stem test of the section produced a slight blow and recovered 230 ft. of muddy salt water.

Hunt Oil Co. 1 J. R. Smith, 10-23n-7w, Claiborne Parish, was still in the Travis Peak in drilling below 8,624 ft. Details have not been released. H. W. Klein 1 A. H. Sims, 34-20n-5w, was in the Cotton Valley below 8,476 ft. Top of the formation was 8,240 ft., by samples, on an elevation of 201 ft.

The California Co. 1 Brown Paper Mill, 10-16n-3e, Ouachita Parish, had recovered bit cones and was drilling ahead below 8,637 ft., in the Travis Peak. Hassie Hunt, Trustee, 2 Whitney Corp., was below 2,435 ft. on a 4,000-ft. contract in 19-10n-13w, Sabine Parish. Sohio Petroleum Co. 1 Raworth, 26-12n-10e, Tensas Parish, had total depth at 8,337 ft., in the Tuscaloosa. A core at 8,329-37 ft. recovered ashy sand with distillate odor, spotted fluorescence and fair porosity. First attempt to run a drill-stem test of the section failed mechanically. Continenta Oil Co. 1 Mansfield, 34-13n-4w, Winn Parish, was drilling in the lower Cretaceous at 7,147 ft.

NORTH LOUISIANA WILDCAT FAILURE

Caldwell Parish: Sohio Petroleum and Republic Natural Gas B-1 LaSalle Land Co., NE NW NE 33-14n-5e, dry, TD 6,008 ft. in Paluxy.

CANADIAN FIELDS

Wet Gas Discovery At Stettler, NE of Calgary

CALGARY.—A wet gas discovery in a Lower Cretaceous sand at 4,340-48 ft. has been made at Piccadilly-Interleduc-Edwards 1, LSD 13, 14-38-21w4, 10 miles southwest of the town of Stettler, and 95 miles northeast of Calgary. The Toronto and Calgary independents who made the discovery plan to follow up immediately with a down flank venture in the hope of tapping crude oil in commercial volume.

After gun perforating opposite the Cretaceous sand, the well was given a 2½-hour drill-stem test. It had an immediate gas blow, building up to an estimated rate of 4,000,000 cu. ft. daily, with a flowing pressure of 1,100 psi. When pipe was pulled, it contained a few gallons of amber-colored 57.5°-gravity distillate. During the final hour of test, the output was burned in flare line, yielding a 75 to 100-ft. high flame, with color of flame indicating presence of distillate.

The pay zone has been further perforated with 20 shots, and crew is now waiting arrival of separator and tubing prior to further testing. The equipment is expected to be installed and ready for test in about 2 weeks.

Prior to drilling into the Devonian (which failed to produce oil or gas), the Stettler well had drill-stem tested the Cretaceous interval from 4,357-68 ft., obtaining a very considerable volume of dry gas. The section now on test, above the dry gas and separated from it by a band of shale, was not previously tested, but showed up on the electric log.

Boyle.—Further augmenting the find at Stettler, is a natural-gas discovery in the Boyle area, made by Continental Oil Co. of Canada. The Continental Boyle 1 wildcat, LSD 16. 22-6-19w4, is located about 75 miles northeast of Edmonton and 20 miles southeast of Athabaska town. Drill-stem test bottom 1,944 ft. gave a dry gas flow estimated at 4,000,000 cu. ft. daily, with a flowing presure of 150 psi., bottom-hole pressure estimated at 500 psi. Coring is now continuing below 2,039 ft.

Pincher Creek.—Canadian Gulf Walter Marr 1, a wildcat in LSD 1, 29-4-29w4, 12 miles south and east of Pincher Creek town and 7½ miles northwest of Gulf's Pincher Creek condensate discovery well, has confirmed top of the Madison limestone at 12,185 ft. The Marr venture has halted drilling 10 ft. in the lime, and is running a series of surveys preliminary to setting a string of casing and deepening into the Madison to determine production possibilities. At —7,835 ft. the Madison top is 310 ft. lower than in the Pincher Creek discovery, encouraging hopes for getting oil instead of condensate.

Schoepp.—Imperial-Schoepp 1, LSD 9, 22-51-27w4, promising wildcat 4½ miles west of the Woodbend field, ran several drill-stem tests in D2 zone of Devonian this week. In the upper level of D2, Schoepp found gas in sizable volume and shows of oil. The zone has been too tight so far, however, to yield oil in commercial volume. The well is currently at 5,122 ft., ready to go on to the main objective, D3 zone.

Woodbend.—Increased interest is focused on the Woodbend field this week as Imperial-Woodbend 16 obtained substantial flows of natural gas in a series of tests in the lower Cretaceous, plus indicated commercial oil production from one of the Cretaceous sands tested. The well, in LSD 3, 21-51-26w4, is ½ mile north and west of present Devonian production. Commercial oil production was indicated when the interval 4,251-63 ft. was tested for 1 hour, and there was a fluid rise in the pipe of 3,960 ft. of gas-cut oil. Further coring and testing, resulted in larger gas flows and small recoveries of oil and oil-cut mud. The well will go on for a test of the Devonian horizon.

Larkhall.—The California-Standard Co. will start drilling in a few days at a new wildcat in the Larkhall area, 8 miles southeast of Medicine Hat, in the southeast corner of Alberta. The new venture, C-S-Larkhall-Province 77-9-12-4, in LSD 13, 9-12-4w4, will test all horizons down to and including the top of the Madison limestone, with completion depth slated at around 3,200 ft. The well is about 6 miles southeast of the Medicine Hat gas field and about 6 miles north of Cal-Standard's Dunmore Province 75-11-11-4 gas well.

Leduc.—British Columbia Recoveries will commence drilling immediately at an interesting Leduc step-out about 1½ miles southwest of the main Leduc field. D2 zone is the main objective for this new venture located in LSD 16, 31-49-26w4.

Stanmore.—The team consisting of British Dominion Oil & Development, Central Leduc Oils, Del Rio Producers, Ltd., and T. L. Brook have staked a wildcat in the Stanmore area. Brook-Stanmore 1, LSD 7, 22-30-11w4, is about 115 miles east and north of Calgary, and some 20 miles southeast of the Hanna-Craigmyle area where oil and gas was recently discovered. Objectives are the lower Cretaceous, Madison limestone, and Devonian, down to the equivalent of D3 at Leduc and Redwater. Estimated completion depth is around 5,300 ft.

Offshore Oil Control Asked in Cabinet Bill

(Continued from page 42)

holding leases from them, from liability for trespasses committed in producing oil or gas from any submerged coastal lands prior to June 23, 1947, the date of the decision in the California case, and from liability to account to the federal Government for oil or gas theretofore extracted from those lands, or for moneys received under such leases. This exemption, however, would not extend to any trespasses committed or moneys received from rentals, royalties, etc., after the date of the decision.

In transmitting the bill to Congress, the three cabinet officials declared that petroleum is vital to our national security and important in our national economy, and went on to explain:

"Within the 3-mile belt off our coast large quantities of oil and gas have been and are being produced and more are believed to exist in the Continental Shelf beyond that belt. Most of the oil and gas now being produced within these areas is in fields that are being drained by wells on land not owned by the federal Government. It is therefore highly desirable that Congress promptly make provision for the conservation and development of oil and gas in the coastal areas below low tide and outside the inland waters of any state. In addition, some equitable relief should be extended to the states and their political subdivisions, grantees, and lessees because of actions with respect to oil and gas taken by them prior to the court's decision in United States v. California and on the assumption that the states owned the oil and gas deposits in these areas.

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XUM

Landon Asks Truman for Quotas on Oil Imports

(Continued from page 38)

plies and the encouragement of international trade within reasonable bounds to be healthy.

"However, it will not be healthy if crude-oil imports into this country are allowed to reach a volume which breaks the present price of domestic crude. Lower prices, or even the threat of lower prices, would discourage wildcatting and development, cause premature abandonment of a large number of stripper wells, thus causing domestic reserves to diminish instead of to increase as they should, and bring unemployment to many oil-industry workers and serious loss to royalty owners, farmers, and others who depend on oil income. Such developments would seriously weaken the industry and adversely affect the whole national economy.

Volume Could Be Adjusted

"Under a quota system directly related to the needs of the domestic industry, the volume of imports could be set periodically at levels designed to provide the volume of additional oil needed after due consideration of the amount which should be produced in this country. Determination of that amount would entail studies of all factors pertinent to a sound national oil policy. This might mean that foreign producers would have to forego supplying a part of the domestic markets which they could supply very profitably in light of their low costs.

"Under this program American producers would also have to make some sacrifices. On occasion, restrictions might be imposed on United States production as efficiency and national interest dictated.

"This would permit us to gradually build up a safety factor, which would be the margin between the ability of fields to produce and actual production. That margin could be put to use if, for any reason, imports were cut off. Such a safety factor enabled us to oil the last war. It might prove equally valuable in some future emergency.

"As stated in the foregoing paragraphs, the program I suggest might require that sacrifices be made by all. But those sacrifices would work to the ultimate benefit of all concerned —the consumer, the domestic producer, and the producer in foreign fields.

"On the other hand, if the oil industry should be seriously weakened by a lack of foresight in policy, the cost would be paid in one form or another by every citizen. Excessive oil imports would surely have such a weakening effect. Decisive action to allay this threat is urgently needed."

Michigan to Offer Leases At Auction February 18

Approximately 46,200 acres of state-owned lands in Michigan will be offered at public auction in Lansing, February 18, for oil and gas lease rights.

Lands in 20 counties will be offered at the sale. All of the acreage, with the exception of three 40-acre tracts, is classified as wildcat.

So-called proven leases, subject to a sliding-scale royalty, will be offered in Richfield pool, Roscommon County, and Beaver Creek field, Crawford County. Two descriptions are in Roscommon County field.

Oil Well Is Presented To East Texas Scouts

Through the efforts of interested oil operators and led by John Wrather, independent producer of Longview, Tex., the Boy and Girl Scout organizations of East Texas recently were presented with an oil well, which upon completion is expected to represent an income of approximately $1,000 per month.

The well, East Texas Boy Scout Foundation, Inc., 1 W. L. Bussey, is located on a 5-acre tract in the Dolores Sanchez Survey of Gregg County, near Spring Hill and about 5 miles northwest of Longview. Drilling of the well is being carried out through donations primarily from the local oil men in Gregg County.

Asks Controls Switch From Exports to Imports

(Continued from page 38)

controls, instead of being employed as a protection to the domestic industry, were actually used as a means to stimulate exports to unprecedented rates," he declared. "Export controls over steel for the petroleum industry have been leading the nation to a position of depending on foreign oil—a position that is dangerously vulnerable to enemy action as was so convincingly demonstrated during World War II.

"If export controls are to be continued, it is our recommendation that the bill be amended so as to require the agency administering export controls of steel pipe to recognize the essentiality of the domestic petroleum industry as a priority source of supply of the petroleum and petroleum-product requirements necessary to the national security; and that in order to protect the domestic industry and to avoid abnormal or disproportionate exports of oil-field steel tubular goods, some one specific agency, perhaps the Oil and Gas Division of the Interior Department, should determine, after consultation with the petroleum industry, the maximum quantity of such goods that may be exported. It is felt that the responsibility for fixing this maximum limit should rest squarely and clearly at a given point and not be nebulously spread over an interdepartmental committee remote from the problems and the individuals affected."

Texas Lease Extension Terms Are Approved

HOUSTON.—Bascom Giles, commissioner of the General Land Office and chairman of the State School Board, has announced that the board has approved terms for the extension of mineral leases under the 25-year statute covering 173 leases embracing 79,115 acres contingent on payment of a bonus of $1,338,056.

Of the leases approved by the board, 61 embracing 21,129 acres are producing oil or gas and 112 are nonproducing. The renewal bonus on the producing leases would net the state a total of $846,965 for an average of $40 an acre.

A group of 10 producing leases bringing a high royalty of from 35 to 52 per cent will be extended for a cash consideration of 25 per cent of the original bonus. These leases have already paid the permanent school fund a total of $2,700,000 in royalties and are expected to yield an additional $8,000,000, Giles said.

On the 112 nonproducing leases totaling 57,960 acres a renewal bonus totaling $491,091 for an average of $8.47 an acre was set up.

On certain leases where the consideration for extension could not be established on the basis of proved reserves, additional royalties ranging from one twenty-fourth to one-fourth of production will be placed on all production obtained after expiration of the present 25-year term, Giles pointed out.

Fields included in the group of lease renewal applications accepted by the board include Bird Island, and East Flower Bluff in Laguna Madre, Cedar Point, Red Fish Reef and Fishers Reef in Galveston Bay; High Island in Chambers and Galveston counties state school leases in Yates field of Pecos County and nonproducing leases in Corpus Christi Bay, Lavaca Bay and the Gulf of Mexico.

Lease holders include Superior, Pure, Sinclair, Atlantic, Tide Water, Humble, Sun, Magnolia, Panhandle Producing & Refining Co., Stanolind, Standard of Texas, Salt Dome, M. D. Bryant, Helmerich & Payne, and W. J. Goldston.

Only 36 producing leases and nine nonproducing leases remain to be acted on by the board. Under state statutes all lease holders have 90 days in which to accept or reject the conditions laid down by the board, Giles said.

STATISTICS and

WEEKLY WELL COMPLETIONS . . WEEK ENDED FEBRUARY 5, 1949

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1949				
	Comp.	Oil	Gas	Dry	Footage	1949	1948	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	21	11	0	*10	20,436	103	201	0	0	0	0	0	0	0	0	0	0
Pennsylvania	40	16	8	†16	67,873	188	373	0	0	0	1	1	0	0	0	1	1
West Virginia	9	2	6	1	22,941	54	82	0	0	0	0	0	0	0	1	2	3
Ohio	23	8	6	‡9	56,786	119	122	0	0	0	1	1	0	0	0	4	4
Indiana	21	7	3	11	38 290	108	102	0	0	0	4	4	1	0	0	20	21
Kentucky	9	5	0	4	13,829	65	73	1	0	0	1	2	1	0	0	5	6
Illinois	28	12	0	16	70,435	202	233	0	0	0	3	3	3	0	0	36	39
Michigan	20	8	1	11	47,584	94	91	0	0	1	5	6	2	0	1	36	39
Kansas	53	26	8	‡19	168,454	283	316	3	0	0	9	12	¶6	0	¶1	43	¶50
Neb., Mo., Iowa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oklahoma	53	32	1	§20	202,806	360	429	5	0	0	9	14	22	3	1	57	83
Texas	188	107	19	62	804,794	1,243	1,171	7	0	3	34	44	41	1	11	214	267
North Central (Dist. 7-B & 9)	47	19	1	‡27	133,300	381	354	3	0	1	11	15	21	0	1	89	111
West (Dist. 7-C & 8)	40	32	2	6	201,337	281	302	2	0	0	4	6	6	0	0	17	23
Panhandle (Dist. 10)	29	15	13	1	97,906	118	69	0	0	0	0	0	0	0	0	0	0
Eastern (Dist. 5 & 6)	14	7	1	‡6	75,821	65	68	0	0	1	2	3	0	0	1	12	13
Gulf Coast (Dist. 2 & 3)	25	16	2	7	149,281	192	201	2	0	1	6	9	8	1	8	46	63
Southwest (Dist. 1 & 4)	33	18	0	‡15	147,149	206	177	0	0	0	11	11	6	0	1	50	57
Louisiana	37	23	5	9	243,606	225	203	0	0	0	1	1	2	0	0	16	18
Northern	20	10	5	5	90,602	133	132	0	0	0	1	1	0	0	0	9	9
Southern	17	13	0	4	153,004	92	71	0	0	0	0	0	2	0	0	7	9
Arkansas	3	3	0	0	16,065	15	45	0	0	0	0	0	1	0	0	7	8
Mississippi	5	4	0	1	43,644	33	42	1	0	0	1	2	1	0	1	9	11
Southeastern States	1	0	0	1	5,424	5	6	0	0	0	1	1	0	0	0	4	4
Montana	3	1	2	0	8,673	20	30	0	0	1	0	1	1	0	1	2	4
Wyoming	22	11	0	11	65,520	57	49	0	0	0	4	4	2	0	0	10	12
Colorado-Utah	2	2	0	0	1,188	20	35	0	0	0	0	0	1	0	0	5	6
New Mexico	11	9	0	2	65,488	49	74	0	0	0	1	1	1	0	0	4	5
California	53	38	0	15	192,281	266	287	0	0	0	9	9	5	0	0	45	50
Total United States	602	325	59	218	2,156,117	3,509	3,964	17	0	5	84	106	90	4	17	520	631
Total previous week	609	333	43	233	2,084,507	2,907	3,381	13	1	5	102	121	¶73	4	¶12	436	¶525
Total February 7, 1948	583	357	35	191	2,076,294			18	4	3	63	88	80	5	24	526	635

Service wells included: *10, †15, ‡1, §2. ¶Revised.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$2.17	..	....	....
19-19.9	2.19	..	....	....
20-20.9	2.21	$2.25	....	$2.12
21-21.9	2.23	2.27	....	2.14
22-22.9	2.27	2.29	....	2.16
23-23.9	2.30	2.31	....	2.18
24-24.9	2.34	2.33	$2.56	2.20
25-25.9	2.38	2.35	2.58	2.22
26-26.9	2.41	2.37	2.60	2.24
27-27.9	2.45	2.39	2.62	2.26
28-28.9	2.49	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.56	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.62	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point. †Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. (For detailed price changes in all fields see The Oil and Gas Journal, January 1, 1948, page 107.)

A.P.I. REFINERY REPORT, WEEK ENDED JANUARY 29

(Thousands of barrels)

District—	Crude runs, daily avg.	Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	762	1,981	276	1,355	1,348	24,357	9,818	21,986	12,204
Appalachian:									
District 1	100	326	56	135	100	2,693	425	937	456
District 2	66	249	15	36	87	1,448	126	221	209
Ind., Ill., Ky.	982	3,290	563	887	1,081	25,623	3,684	9,676	5,174
Okla., Kans., Mo.	424	1,612	183	567	523	11,407	1,040	4,179	2,634
Inland Texas	250	1,109	95	200	428	4,167	528	691	1,206
Texas Gulf Coast	1,359	4,227	826	2,231	1,643	18,897	2,980	11,843	10,843
La. Gulf Coast	439	1,359	442	622	402	6,328	1,954	3,575	3,499
N. La. and Ark.	70	217	49	55	90	2,786	442	819	290
Rocky Mountain:									
New Mexico	12	49	5	22	27	109	35	45	35
Other Rocky Mtn.	149	490	24	184	282	3,151	146	1,267	945
California	877	2,622	54	1,253	2,167	13,711	695	12,193	46,967
Jan. 29, 1949	5,490	17,531	2,588	7,547	2,178	114,677	21,873	67,432	84,462
Jan. 22, 1949	5,556	17,961	2,354	7,944	8,744	111,587	22,125	68,746	85,075
Jan. 31, 1948	5,434	15,986	2,561	7,690	9,141	102,988	11,719	40,607	50,839

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 255,459,000 bbl. as of January 29—up 1,106,000 bbl. One year ago 227,759,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.	
East Texas†	$2.65
Kettleman Hills, California*	2.14
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	4.00
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

XUM

TRENDS

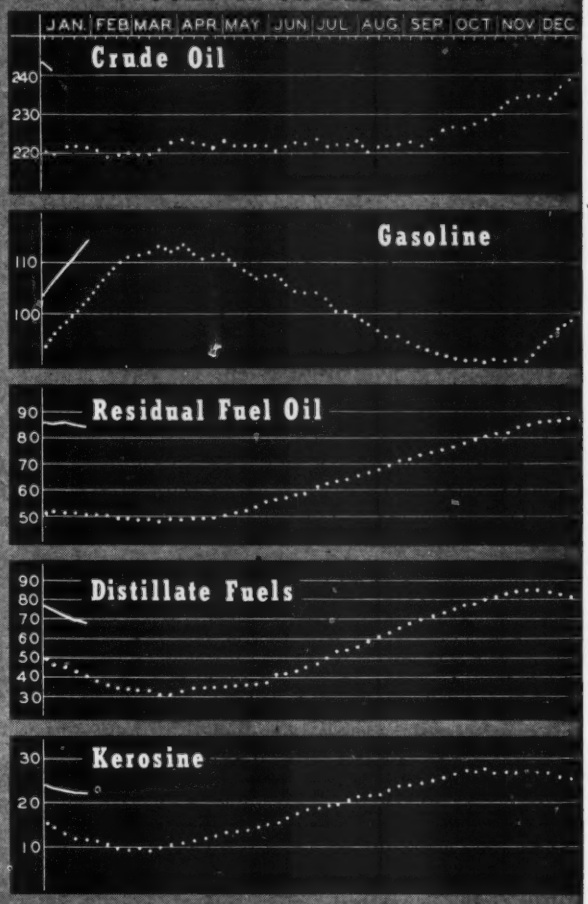
DAILY AVERAGE PRODUCTION FOR WEEK

	Feb. 5 crude oil	B. of M. Jan. demand	Jan. 29 crude oil
Alabama	1,200	1,700	1,350
Arkansas	82,600	84,000	83,500
California	946,100	950,000	949,800
Colorado	*62,100	52,000	62,150
Eastern	63,000	62,300	61,910
Florida	1,200	1,300	1,250
Illinois	177,300	165,000	179,000
Indiana	23,200	21,000	23,100
Kansas	245,550	300,000	295,500
Kentucky	23,200	22,000	23,700
Louisiana	506,150	483,000	504,250
North Louisiana	120,200	.....	119,200
South Louisiana	385,950	.....	385,050
Michigan	46,500	45,000	46,350
Mississippi	109,450	126,000	110,550
Montana	24,050	24,000	24,500
Nebraska	300	700	300
New Mexico	135,075	127,000	135,500
Oklahoma	450,600	425,000	453,050
Texas	2,324,550	2,450,000	2,333,490
Dist. 1 (Southwest)	27,675	.....	26,910
Dist. 2 (Southwest)	157,650	.....	162,025
Dist. 4 (Southwest)	221,600	.....	225,550
Dist. 3 (Gulf Coast)	445,325	.....	452,755
Dist. 5 (Eastern)	45,125	.....	46,150
Dist. 6 (Eastern)	109,725	.....	115,475
East Texas field	309,150	.....	289,000
Dist. 7-C (West)	49,500	.....	48,350
Dist. 8 (West)	664,925	.....	676,850
Dist. 7-B (Central)	64,975	.....	62,600
Dist. 9 (Central)	139,200	.....	138,625
Dist. 10 (Panhandle)	89,700	.....	89,200
Wyoming	141,000	140,000	137,500
Total United States	†5,363,125	5,480,000	5,425,750
Change from prev. wk., dn.	63,625		

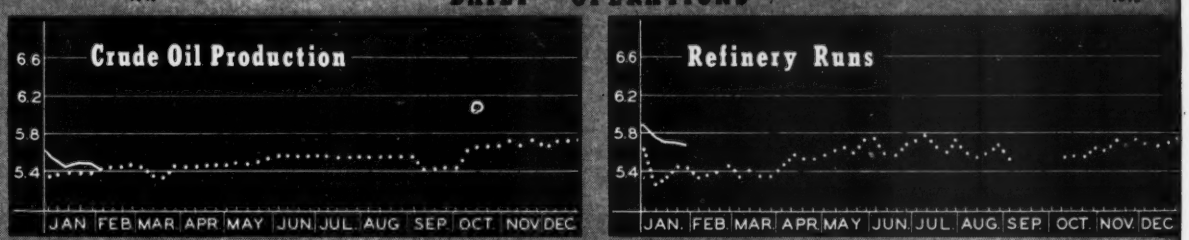
Total production January 1-February 5 ... ‡198,377,750 bbl.
Same period last year (crude plus cond.) 194,179,375 bbl.

*Incl. 150 bbl. Utah production. †Not incl. 84,760 bbl. condensate. ‡Incl. 2,959,995 bbl. condensate.

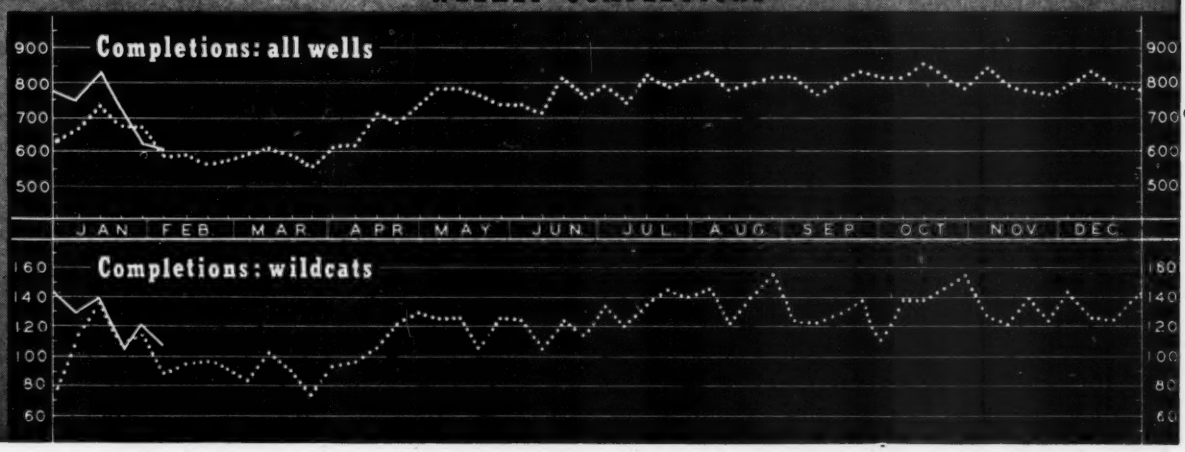
STOCKS IN UNITED STATES



DAILY OPERATIONS



WEEKLY COMPLETIONS



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You get fluid circulation in much greater volume at low pump pressures with the Guiberson Ful-Flo Kelly, because it has twice as much fluid opening as conventional bored forged kellys. Built like a truss, with round seamless tube welded inside square seamless tube, for maximum strength with minimum weight.

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- smooth, seamless inner wall
- perfectly balanced—no whip
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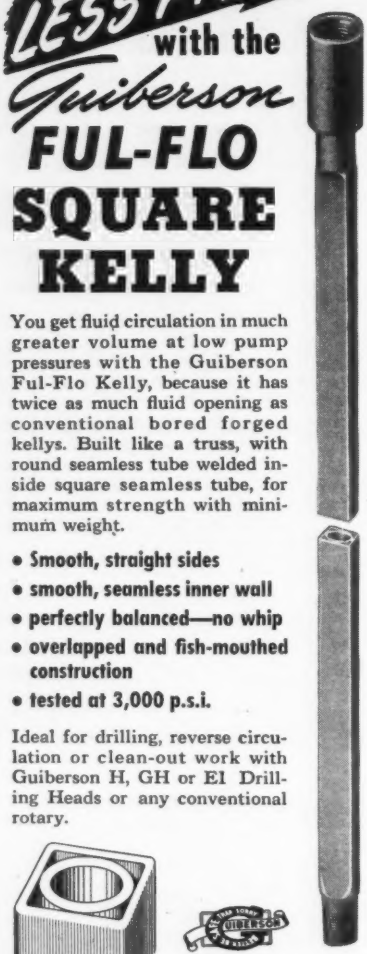
- tested at 3,000 p.s.i.

Ideal for drilling, reverse circulation or clean-out work with Guiberson H, GH or El Drilling Heads or any conventional rotary.



Reg. U. S. Pat. Off.

Size	Overall Length	Bottom Connection	Top Connection	Size Opening
2½"	18½ ft. 21½ ft. 23½ ft.	2" A.P.I.—8 Rd. Thd. Upset	3" L.H. 8 Rd. Thd. Int. Upset Drill Pipe	1⅝"
3"	21½ ft. 23½ ft. 26½ ft. 36 ft.	2½" A.P.I.—8 Rd. Thd. Upset	3" L.H. 8 Rd. Thd. Int. Upset Drill Pipe	1¾"

For full information see 1948 Composite Catalog, page 1524, or write to

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MARKETS

CONTINUED weakness in the products spot-market price levels and the high production of both crude and products was apparent in market developments over the past week in nearly all marketing areas.

Because of the weak market for heating and fuel oils numerous refiners were reported to be decreasing runs to stills. Tide Water Associated Oil Co. is reducing crude runs at its Bayonne, N. J., refinery by 5 per cent or about 4,000 bbl. daily during the first quarter of this year.

At Texas City, Tex., Sid Richardson Refining Co. cut its crude runs from 19,000 to 9,000 bbl. daily. The 9,000 bbl. corresponds to the cracking capacity of the plant indicating a market for the light products, but not for the heavier ends.

Mid-Continent Area

In the Mid-Continent area the brightest outlook marketwise last week continued to center around the slight increased movement and demand for light burning oils due to the low-temperature weather; however, shaded prices were still far from being uncommon, it was reported. No. 6 residual oil continued weak and remained the "problem product."

Market observers generally in this area were strong in the belief that both crude production and runs to stills must be curtailed in order to relieve the high stock levels of burning and residual oils.

Accepted published prices for the Mid-Continent area continued to register a definite softening in the price level for most petroleum products. Housebrand gasoline was down ⅛ cent on the low and ¼ cent on the high; kerosine was reduced ⅛ cent on the low and ¼ cent on the high; range oil was down ⅛ cent on the low and ⅜ cent on the high; No. 6 saw a reduction of 5 cents on the low and 15 cents on the high.

The recent 1-cent drop in the natural-gasoline price has not brought on any increase in buying, it was reported. One supplier said that few refiners were willing to take on blending material in the face of a declining market particularly while motor fuel continued to be moving so slow.

One major Mid-Continent refiner reported a reduction of 3 cents in the price for 150-160 vis., D bright stock, 0-10 pp. bringing the quotation for this material to 24 cents per gallon. The new price for No. 3 neutral, 0-10 pp. was 17 cents.

Gulf Coast Area

Indications of an over supply of crude were on the increase in the Gulf Coast area last week, particularly for the heavier grades. Fuel prices dropped with Bunker C for cargo loading down 15 cents to $1.55. No. 2 dropped ¼ cent per gallon to 7.5 cents. Gasoline purchases continued strong. Kerosine, however, showed a weakening for the first time in recent weeks.

New York Harbor

The fourth reduction in recent months in the price of heavy fuel oil last week forced the posting down to $2.10 in New York Harbor. The latest cut amounting to 20 cents a barrel was announced by Esso Standard Oil Co. effective February 2. It was promptly met by other major suppliers.

The total amount by which heavy fuel oil prices have fallen now stands at 90 cents. The price of heavy fuel oil in New York Harbon is 55 cents under the posted price of Mid-Continent and East Texas crude oil.

Representative Quotations

Representative spot-market quotations of leading suppliers as of February 7, 1949. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	9¾-10	12.0-12.4* 11.0-12†	10.3-12.5
Premium gasoline, 78-80 octane	10½-10¾	12.0-13.4	11.0-13.5
42-44 w.w. kerosine	9⅛-9⅜	10.3- ...	9.1-10.5
No. 2 straw fuel oil	8¼-8½	9.1- ...	9-9½
No. 6 residual	$1.35-1.45	$2.35-2.45	$2.05-2.08

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	7½	7	7¼
Grade 18-55	9	8.4	8.7

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	12-13.5
750 vis., No. 3-4 neutral	15-16.5
2,000 No. 5-6 neutral	17-18.5

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	24
200 vis., No. 3 neutral, 0-10 pp.	15

Western Pennsylvania

144-155 vs. 10 p.t. bright stock	27.0-40.5
180 vis. p.t. neutral	27.5-38.5

CRUDE-SCALE WAX

Mid-Continent

132-134 A.M.P.	8

BUY STEEL TAPES WITH EASY TO READ MARKINGS THAT ARE DURABLE

Jungle dampness . . . immersion in sea water . . . chemical fumes—these and many more rugged war time tests have proven Lufkin Chrome Clad to be an outstanding development in measuring tapes.

The illustrations below show why they are the first steel tapes with both durable and easy to read markings, features every tape user will welcome. The hardened steel base is of remarkable toughness and flexibility.

Over this goes a rust resistant coating—next, multiple coats of electro-plating—and then a heavy chrome plating with a non-glare satin finish. Against this light-absorbing surface the jet black markings stand out sharply, easy to read in bright or poor light.

And notice how the markings are bonded to the steel base—sunk below the chrome surface to protect them even against concrete or gravel wear. If you want a tape with durable, easy to read markings—a tape that will not crack, peel or chip, a tape for tough usage—ask your dealer for Lufkin Chrome Clad.

KINKS RARELY BREAK THEM

A tough flexible "kink-resistant" steel protects against line breakage, and saves time as well as repair expense.

DIAGRAMMATIC CROSS-SECTION VIEW

1. Hardened Steel Tape. 2. Rust Resistant Coating. 3. Multiple Coats of Electroplating. 4. Hard, Smooth, Non-Glare Chrome-Plating. 5. Black Markings Bonded to Steel, Sunk Below Surface.

EASY TO READ IN ANY LIGHT

Durable, easy to read markings stand out sharply against the non-glare, chrome surface, even after years of tough usage.

"ANCHOR" Model . . . Preferred for heavy duty in the oil fields because of its greater durability and *unusually* large, easy-to-read figures, both made possible by the full ½" width of the sturdy steel line. Permanent jet black markings available in either the English or Metric system —or both. Hand-stitched genuine leather case protects rust resistant steel liner.

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EQUIPMENT MEN ... in the News

Koppers Names Macon Sales Manager of Tar Products

J. C. MACON, JR.

J. C. Macon, Jr., assistant sales manager of the Tar Products division, Koppers Co., Inc., since September 1947, has been named sales manager of the division. In his new position, Macon succeeds R. R. Holmes, who recently was named as assistant general manager of the division.

Macon attended William College, and then worked 2 years with Gulf Oil Corp. He joined Koppers in July 1935, and was assigned to the Tar Products division's district office at Birmingham. In 1941 he went to Pittsburgh to work in the division's creosote oil sales department, and was again assigned to Birmingham in 1943 as assistant district manager of that office. In 1946 he was made sales manager of the tar department of the division, with headquarters in Pittsburgh, and in September 1947 became assistant sales manager of the division.

Royal Dutch Inaugurates Flight to Barcelona

Royal Dutch Airlines, on its thirtieth anniversary, announces a new service to Barcelona, Venezula. The flight is scheduled to leave Miami at 11 p.m. and arrive at Barcelona the following day at 11:30 a.m.

Royal Dutch states that it is the only carrier providing connection between the United States and three international terminals in Venezuela, namely, Barcelona, Caracas, and Maracaibo.

Totco Service Engineer Makes Eurasian Tour

R. B. Paddock, service engineer, Technical Oil Tool Corp., Ltd., left New York early in February to visit oil-company offices in Europe and all of the oil fields of the Near, Middle, and Far East. Objective of the trip, expected to require 8 months, is to inspect and test all Totco equipment for controlled vertical drilling in use in the fields and to advise on maintenance and replacement of equipment, much of which has been in operation since before the war. Paddock has had thorough training in the Totco laboratory and extensive field experience in applying the techniques of controlled vertical drilling.

In addition to his work of inspecting and testing Totco equipment, he will be at the service of oil-company engineers for consultation on the application and extension of controlled vertical drilling to each area.

Mid-Continent, Gulf Coast, and Pacific Coast division executives of Lane-Wells met at the company's home office in Los Angeles January 10-15 to discuss 1949 technical service needs of the oil industry. Shown following a day of conferring are: M. T. Higgs, manager, field operations; W. S. Keim, manager, industrial relations; C. F. Ludwig, Gulf Coast division sales manager; J. D. Hughes, sales manager; J. W. McPhee, Pacific Coast division manager; R. S. Durkee, president; R. B. Downing, Mid-Continent division manager; Ray Hancock, Pacific Coast division assistant manager; D. S. Jeppson, vice president and controller; J. J. Neale, Gulf Coast division manager; C. L. Kirkman, Mid-Continent division sales manager; N. L. Dorn, vice president and chief engineer; and E. A. Miller, works manager

Stewart and Stone Join Ideco Sales Staff

C. Earle "Stew" Stewart, formerly drill sales representative, and S. A. "Rocky" Stone, formerly eastern sales representative, both with Bucyrus-Erie Co., have joined International Derrick & Equipment Co. Stewart becomes eastern sales representative for Ideco and Stone, eastern drill sales manager. Stewart has a long background in cable-tool equipment having become a roughneck in 1926. In 1937 he joined Star Drilling Machine Co. as sales representative. Stone started in the equipment business in 1934 with Parkersburg Rig & Reel Co. He joined Continental Supply Co. and was field service representative until 1939 when he joined Franklin Supply Co.

Henry S. Moore Appointed Director of Engineering

Manning, Maxwell & Moore, Inc., announces that Henry S. Moore has been appointed director of engineering and development for the Consolidated - Ashcroft - Hancock divisions of the company. Moore is a 1935 graduate of University of Arizona and became associated with the company in 1938.

Prell Joins A-1 Bit and Tool Sales Department

Furniss M. Prell formerly of Hughes Tool Co., has accepted the position of Central Louisiana division sales manager with A-1 Bit & Tool Co. His headquarters will be in Lafayette, La. Prell entered the oil business 30 years ago, first working for The Texas Co. as a roughneck and driller, then 2 years with Trinidad Leaseholds, Ltd., following which he spent 8 years with Shell Oil Co., Inc., as drilling foreman. He was connected with Hughes for 13 years in various capacities in the sales department.

Amstutz Named Industrial Engineer for Oil Well Supply

Gordon M. Amstutz has joined U. S. Steel's Oil Well Supply Co. as chief industrial engineer. He will be located at Oilwell's Imperial works at Oil City, Pa. Amstutz was graduated in electrical engineering from Ohio State University in 1927. Following his graduation he served as a time-study engineer for B. F. Goodrich Co., at Akron, and later as an industrial engineer with Reliance Electric & Engineering Co. From 1934 until 1946 he was connected with Armstrong Cork Co., located first at Lancaster, Pa., and for the next 4 years at Beaver Falls, Pa., where he was manager of that company's plant. In 1946 he became director of production for Denison Engineering Co., of Columbus, and held that position until his present appointment.

T. E. Ward Will Make South American Trip

Thomas E. Ward, president, Oilfield Equipment Co., Inc., will visit Brazil, Uruguay, and the Argentine during February and March. Oilfield Equipment Co., Inc., represents Burt Machine Works, Webster Engineering Co., and other manufacturers of oilfield equipment and supplies. Ward also represents Columbian Steel Tank Co., Kansas City, Mo.

Leeds Given Edison Award

Morris Evans Leeds, chairman of the board of Leeds & Northrup Co., Philadelphia, was presented the 1948 Edison medal by the American Institute of Electrical Engineers at its winter meeting, February 2. The award was made to Leeds for "his contribution of electrical precision measuring devices and controls."

Wieschendorff to Represent Dearborn Chemical in West

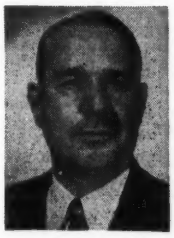
Dearborn Chemical Co., manufacturers of water-treatment chemicals and rust preventives, has announced the appointment of W. R. Wieschendorff as district manager of its western offices.

Wieschendorff started with Dearborn as an office boy in 1925 and was assistant traffic manager when he joined the company's sales staff in 1939. For the past 10 years he has been sales representative in Dearborn's central Wisconsin territory.

He will make his headquarters in the Los Angeles office and will also supervise the operation of the San Francisco and Seattle branches.

A 3-day sales meeting in January, of American Iron & Machine Works Co. at Oklahoma City, was for the purpose of thoroughly acquainting personnel with detailed information concerning the application of the new straight grip tool joint and Amweld (counterbore weld) tool joint. Attending the meeting were: M. G. McCool, E. E. Rubac, C. L. Griffin, Odus Gardenhire, E. H. Royle, Bryan Curtis, Fern Wagner, Herb Risner, L. C. Smith, W. L. Martin, Joe Castles, Andy Pullen, Roy Meredith, W. F. Behrhorst, Walt McCharen, O. W. Frogge, J. J. Sloan, P. L. Gillis, J. M. Taylor, B. E. Sharp, C. L. Allred, Herman Lawson, and Bruce Fields

Mumma Export Manager of Black, Sivalls & Bryson



H. L. MUMMA

Harlan L. Mumma, Black, Sivalls & Bryson, Inc., has been appointed world export manager of the company with headquarters at New York City. Recently returned from a tour of industrial centers in several South American countries, Mumma expressed himself as tremendously impressed and encouraged by the post-war industrial expansion of our neighbor continent to the south.

In addition to oil-field equipment which has made up the bulk of the company's export trade in the past, tanks will be offered to the rapidly growing L.P.G. industry in South America. Earl Ruth, formerly sales engineer in the Kansas City executive offices, has been appointed to Mumma's staff as consulting engineer.

Monarch Names Vogel

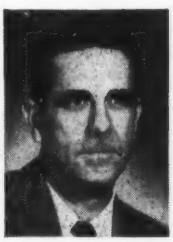
Monarch Engineering Corp., Gardena, Calif., recently organized by Walter B. Losk and James T. Hatch for manufacture of subsurface pumping equipment, pump parts, couplings, and related accessories, has appointed as its Mid-Continent distributor, C. S. "Foggie" Vogel of Fort Worth.

J. H. Conners is Made Reco Export Manager

Refrigeration Engineering Corp., Philadelphia, has announced the appointment of Jack H. Conners as export manager, in charge of promotion and sales activities on gasoline and diesel-engine-driven condensing units, prefabricated sectional freeze coolers, ice-plant components, supplies, and other items for salt through authorized Reco dealers in foreign markets.

Connors holds a degree in mechanical engineering from University of California, and has had over 20 years experience in the machinery and refrigeration fields. He was associated for many years with leading refrigerating and heavy-construction-machinery concerns on the West Coast, and is familiar with foreign trade practices and marketing.

Humble Makes Brewer Head Of Products Manufacturing



T. J. Brewer has been appointed general superintendent of the special products manufacturing division of Humble Oil & Refining Co.'s sales department. This is a newly created position. Brewer has been with Humble for more than 20 years and for the past several years has been directly connected with the sales department.

The special-products manufacturing division employs approximately 75 people and is engaged in the manufacture of special petroleum products including protective coatings, cutting oils, lubricants, solvents, insecticides, and oil-treating chemicals.

(Continued on page 151)

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads, 12 cents a word. Minimum charge, $3.00 per insertion.
Centered Line, any ad, $1.00.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$12.00 per column inch per insertion
One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR SALE: Used Bethlehem S-40 Unit complete, powered with 145-GKU Waukesha Engine. Actually used 314 hours. C. L. McMahon, Inc., Tulsa, Oklahoma.

SHOT hole drill on Ford truck, Hyd. lift mast, chain pull down, 3" solid kelly, 4½" x 6" G. D. pump, twin disc clutches. $5000.00. Waters Drilling Service, 69 Beacon Place, Pasadena 8, Calif.

FOR SALE IN STOCK, Quick Delivery:

New Welded Steel Tanks and bolted; Used Welded and bolted Steel Tanks, for Oil, Water, Gasoline, Grain, etc. Tool Houses, any size, built ready to go. Call or write

INDEPENDENT TANK CO.
Phone 977, Box 102 Seminole, Okla.

OFFERED TO ULTIMATE USERS ONLY

If Not Sold

a Future Ad Will Be

Directed to Jobbers

2,500 feet of 24-inch, .312 wall, A. O. Smith electric weld line pipe in 40-foot joints, plain end, beveled for welding, located in the Keystone Field, near Kermit, Tex.

If interested contact W. F. Matheny, Sid Richardson Gasoline Co., 629 Fort Worth Club Building, Fort Worth, Tex., or G. H. Billue, Sid Richardson Gasoline Co., Kermit, Tex.

EQUIPMENT FOR SALE

TWO TOM DIETLE Pipe Pulling Machines, double-drum, double-brake, with spudding attachment. Phones 2-0061 and 7-5013, Tulsa, Oklahoma. Mailing Address: Dietle and Martin, 917 No. Elm, Eureka, Kansas (Phone 1032).

FOR SALE: Three Worthington horizontal duplex hot oil pumps, 23 x 5 x 24, with forged steel liquid ends, rated 750 pounds square inch discharge pressure. Used in refinery operation. Good for irrigation projects, plastic industry, paper plants. Good condition. R. H. Armstrong, Republic Oil Refining Company, Texas City, Texas.

FOR SALE: Wilson Mogul Drilling Rig. Lee C. Moore 87' Jackknife Derrick. Compound GAK Waukesha Motors. 6x16 Wilson Snyder Pump. Capable of drilling 5000 ft. Complete rig in good condition. Terms if desired. Blalack Drilling Company, Box 1145, Gladewater, Texas. Phone 324. Price $35.000.00.

FOR SALE: Approx. 600' of 7" 22# used Seamless Casing, 1500' of 2½" 10thd Seamless used Tubing. Tennant Drilling Co., 210-211 Rivoli Theatre Bldg., Blackwell, Okla.

FOR SALE: One New 1948 ELI Model M-7 Rotary Drill, Truck mounted, complete to start drilling, with 2000' 2⅞" Drill Pipe. One 1947 ELI Model M-6 Rotary Drill, Truck mounted, complete with large light plant, extra U-4 International Engine, large tool house, and misc. hand tools, less drill pipe. $8650.00. One 1947 Franks Model FA Heavy Duty Rotary Drill, Truck mounted, complete with large light plant and portable tool house, less drill pipe. $7500.00. Utility & Industrial Supply Company, Box 168, Mt. Pleasant, Michigan.

FOR SALE: Three new Buda PCD1879 Diesel Engines. Engines are complete with radiator but less flywheel housings. A real buy at $5.800 each. Also one new 140 HKU Waukesha multi-fuel engine with all Hesselman parts included. Price $1.200. Box C-761, The Oil and Gas Journal, Tulsa, Oklahoma.

NEW **USED**

ALL SIZES

Immediate Shipment

CASING

PIPE

TUBING

Oil—Water Well—Gas

Columbus Steel Supply Co.

UN 1175 — L.D. 394

Columbus 3, Ohio

STEEL

For All Purposes

Immediate Delivery

East and West Coast Warehouses

Write — Phone — Wire

LONG ISLAND BEAM CO.

39-21 21st St. Long Island City 1, N. Y.
Stillwell 6-5900-1-2

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

2—M.C. 350 Bethlehem rotary drilling rigs complete with 127' Lee C. Moore Cantilever (Jack-knife) derricks, less drill pipe and drill collars. For further information write: Sharp Drilling Company, P.O. Box 1271, Midland, Texas.

SAVE WITH SAFETY—Very Good Used Wire Line—Any Size or Length up to 5,000' —Respooled for Your Inspection — Cable Tools For Sale. General Tool & Supply Co., P.O. Box 4387, Phone 61335, Oklahoma City, Okla.

SEVERAL 10¾" and 13⅜" O.D. Used Wilson Side Door Elevators. Also few other sizes and makes. Advise your wants. Zanesville Tool and Supply Company, Zanesville, Ohio.

BUCYRUS-ERIE 36L Spudder, Trailer Mounted, complete with 6, 8 and 10" Spang Tools. Spudder and Tools in A-1 Condition. Box 338, Albany, Kentucky.

BUCYRUS-ERIE 24L Spudder, Trailer mounted; over 5,000 feet line; 2 strings of tools 4 inch to 10 inch; 2½ ton G.M.C. Tandem Dual Truck with detachable A-Frame and winch; 8-ft. x 10 ft. metal tool shed; Kohler Light Plant; 470 ft. new 10 inch wrought iron pipe; some used 6 and 8 inch pipe. All $10,000.00. Lealand West, The Scott County State Bank Building, Scottsburg, Indiana, Telephone 4931 or 4391.

WE wish to reduce our operations to one rig and offer for sale either of the following rigs. 1—U 15 Drawworks 2-NKU motors; 7¼ x 14" Oil Well PHD pump; 2—8' x 8' x 30' factory built slush pits; Reagan BOP; Thompson LR Shaker; 127' Lee C. Moore Mast; Steel Tool house; Steel Pipe racks; water tank; 4-drill collars, B. J. hook, Gumbo Buster 17½ table & etc. Rig complete ready for drilling, has drilled 23,000 ft. of hole. 6800 ft. 4½" drill pipe, Reed shrink grip joints (drilled 18,000 ft. of hole)—Price $100,000.00.

1—U10 Drawworks 2-RXIS LeRoi motors; C-150 pump, Lr Shaker, National hook, block & rotary table; 2—tool houses & etc.; 5700 ft. 4½" drill pipe. Rig complete ready for drilling. Price $40,000.00. B. & B. Drilling Co., Pauls Valley, Oklahoma.

FOR SALE

56 Miles 8" and 28 miles 6" line pipe. Now being lifted in eastern Pennsylvania Interested parties contact

PIPE LINE CONSTRUCTION & DRILLING CO.
Camp Hill, Penna. Phone 3-7804

USED STEEL PIPE AND TUBING

100,000 ft. of 1½" O.D., 8 gauge
75,000 ft. of 2" O.D., 10 gauge to 11 gauge
100,000 ft. of 2¼" O.D., 10 to 11 gauge
50,000 ft. of 3¼" O.D., 9 gauge
40,000 ft. of 4" O.D., 10 to 11 gauge
50,000 ft. of 5½" O.D., 8 gauge

All the above is seamless, plain end, hydrostatically tested for 850 lbs. pressure.

16,000 ft. of 3" standard line pipe, 8 thread
25,000 ft. of 6" I.D. welded steel pipe, approx. ⅛" wall, plain end
6,000 ft. of 7" O.D. lapweld casing, 8 thread, 20 lbs.
3,400 ft. of 14" O.D. Naylor spiral welded steel pipe, 14 gauge, 40' lengths, grooved for Victaulic couplings

Reasonable prices. Immediate shipment

Also, bolted, welded and riveted steel tanks for storage and pressure.
600 tons of steel plates from ⅜" to ¼" coming from grain tanks, like new, free of holes.

Please send for our late lists.

A. GREENSPON PIPE CO., INC.
3615 Olive Street St. Louis (8), Mo.
Phones Nos. Franklin 0064 and 1606

EQUIPMENT FOR SALE

FOR SALE: Butane storage vessels. Two 34'2" length x 10' diameter x 1-5/32" heads x 1⅛" shell, code welded. $3,300.00 each. Box 610, Mt. Pleasant, Texas.

FOR SALE: 1 Bucyrus-Erie 24-L Rig mounted on International Truck. No tools. The Ohio Drilling Company, Massillon, Ohio.

FOR SALE: One rotary drilling rig complete, capable of drilling to 4,000 feet with ease. Powered with two 6 Cyl. 185 H.P. G.M.C. Diesel motors. 7¼ x 12 Gardner-Denver pump that has only drilled 2—3,000' wells. 86' mast made out of 4½" drill pipe. Raises same as L. C. Moore and only drilled one well. Complete with approximately 2,500 feet 4½-inch Range 2, F. H. drill pipe. Will sacrifice for $25,000.00. Alide Wells Company, 1449 South Broadway, Denver, Colo.

FOR SALE

CLARK 40 HP 4-cycle, heavy duty gas engine. A good buy. Can arrange to have Clark Bros., Olean, inspection. Frank S. McDiritt, Eldred, Penna. Phone 87R24.

FOR SALE—(1) 243-C Star Heavy Duty Spudder. In A-1 condition with regular Star Mast 52'. $4500.00. OR: (1) 60' (A) Mast made of 32# Seamless casing with six roller bearing sheaves in crown. $5250.00. Jack Caudle, Hotel Emerson, Princeton, Indiana.

1—SUPERIOR — Type FB — 6 x 7 Vertical Gas Engine Complete with Standard Equipment: Located in Houston. Will guarantee as good as new. Box C-783, The Oil and Gas Journal, Tulsa, Oklahoma.

MURPHY DIESEL, ME-66

Brand New—Sacrifice—At OEM's Cost 1103 cu. in., 6-cylinder, 180 HP, @ 1200 RPM. Never been used. 20% off list. Contact: Box C-613, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE

Three 8000' capacity steam rigs complete with 129' releg derricks and substructure, blowout preventers, drill pipe, and everything ready to put to work. Rigs located at or near Alice, Tex.

For further information, write

AL BUCHANAN DRILLING COMPANY
2114 Alamo National Bldg.,
San Antonio, Texas

or Frank Buchanan, c/o Al Buchanan Drilling Company, Box 1308, Alice, Texas

IN STOCK FOR IMMEDIATE DELIVERY

NEW PLAIN HOT ROLLED MILD STEEL SHEETS AND PLATES IN STOCK IN NEW YORK

Approx. 150 tons—12 USG Size 36" x 96"

In Stock in New York and Baltimore
Approx. 220 tons ¼" Size 60" x 180" or 60" x 240"

For February Shipment to North Atlantic or Gulf Ports
Approx. 125 tons 10 USG Size 60" x 120" or 60" x 144"

Approx. 125 tons ¼" (11 USG) Size 60" x 120" or 60" x 144"

FABRIKANT
Steel Products, Inc.
50th Floor—Woolworth Bldg.
NEW YORK 7, N. Y. BEekman 3-3041
CABLE ADDRESS: FABKANT, NEW YORK
MEMBER Association of Steel Distributors

EQUIPMENT FOR SALE

FOR SALE: 1—7¼" X 15' Drill Collar (good condition)—$400.00; 1—6¾" X 23' Drill Collar (good condition)—$500.00; 1—7 X 12 Star Steel Tool House—$300.00; 1—4,000 Gallon Butane Tank like new, skidded, can license anywhere — $1600.00. Phone 4-1213, Wichita, Kansas.

FOR SALE: Near Burrton, Kansas, 1—18' x 101' x 35' Fluor Atmospheric Cooling Tower Model 12-N with 4 wood water pans. Standing. Cities Service Oil, Patridge, Bartlesville, Okla.

All sizes new and used Bucyrus-Erie Spudders. Prompt delivery. Zanesville Tool and Supply Company, Zanesville, Ohio.

WELL drilling spudders, beams, light rotaries, core drills, tools, casing. Used equipment at money saving prices. Spang and Mills new tools. Leschen lines. Everything for well drilling. Pressey & Son, Pueblo, Colo.

FOR SALE

12—230 H.P. Type 10 Bessemer New 17" Power Cylinders complete ready to run with 16" to 18" Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

FOR SALE

1—70 HP Superior Gas Engine
1—26 x 9 x 24 Worthington Simplex Hot Oil Pump with Forge Steel Head
1—18 x 8 x 18 Worthington Duplex Hot Oil Pump with Forge Steel Head
2—30 x 12 x 24 Worthington Duplex Hot Oil Pumps with Forge Steel Head
1—20 x 12 x 16 Blake Steam Pump
4—14 x 7 x 16 Carbondale Simplex Pumps
2—16 x 8 x 16 Carbondale Simplex Pumps

BANKOFF PIPE & SUPPLY CO.
P.O. Box 2301, Tulsa, Okla.
Ph. 6-2119

NEW A.P.I. STEEL BOLTED TYPE TANKS

4— 250 bbl.	4— 1,500 bbl.
4— 500 bbl.	4— 2,000 bbl.
6— 750 bbl.	1— 5,000 bbl.
4—1,000 bbl.	6—10,000 bbl.

2—500 bbl. aluminum, 8 gauge

All for immediate shipment

A. GREENSPON PIPE CO., INC.
3615 Olive Street St. Louis 8, Missouri

RECONDITIONED SEAMLESS TUBING

95,000 ft. 1½" O.D.
120,000 ft. 2" O.D.
55,000 ft. 2¼" O.D.
75,000 ft. 3¼" O.D.
80,000 ft. 4" O.D.
21,000 ft. 5½" O.D.

Single or Double Random Lengths—Plain Ends
Beveled for Welding
Approx. 10 ga. Wall

Write—Wire—Phone

SONKEN-GALAMBA CORP.
2nd and Riverview (X-422)
Kansas City 18, Kansas
THalcher 9243

EQUIPMENT FOR SALE

FOR SALE: 4,000' of 4½" OD used drill pipe. Joe Wyant, Panoma Corporation, P.O. Box 381, Guymon, Oklahoma, Phone 704M.

FOR SALE: J-55—5½"—17# Casing, drive pipe from mill, 10,000 ton contract; in-users only. Box C-791, The Oil and Gas Journal, Tulsa, Okla.

PIPELINE Construction Equipment for Sale: Pipe cleaning machine with priming head, traveling or stationary, 6" to 12", excellent condition, $1,350. Two T40 International tractors with pipelayer attachments, good condition, very cheap. Contact C. W. Sternberg, 8250 Wier Drive, Houston, Texas. Phone Preston 7043.

MANUFACTURERS LATEST DESIGN

Hydraulic Casing Pulling Units. Complete line of equipment. Units made to your specifications. Truck Mountings or Skid Units. Repair Service and Parts

OKLAHOMA MACHINE & SUPPLY CO
Ada, Oklahoma

SHOT HOLE DRILLS
LARGE AND SMALL

All are truck mounted, rotary chain pull down, smallest pump size 3½ x 8. Some are in excellent condition, others need repairs. Price FOB Dallas from $3,000.00 to $8,000.00 including truck. For details write 8800 Lemmon Ave., Dallas 9, Texas.

FOR SALE

3713 feet 9⅝ O.D. 40.6# Seamless Oil Well Casing. Run in well but in excellent condition. Priced to sell.

1—125 H.P. 350# Working Pressure "Oil Well Boiler," completely reconditioned and in excellent condition. State inspected. $2250.00 our yard, Okla. City.

POWELL BRISCOE, INC.
1916 First National Bldg.
Oklahoma City, Okla.

OFFERED TO ULTIMATE USERS ONLY

If Not Sold
a Future Ad Will Be
Directed to Jobbers

Two 338 H.P. INGERSOLL-RAND GAS ENGINES, direct connected to 234 KW generators, complete with air fin coolers, bus bars, synchronizing equipment, five switch racks, air jammers, air, oil and water tanks, fully equipped; in fact, a complete power plant ready to go. This equipment is all new. The engines have never been run and the equipment has been housed in a brick building.

15,000 feet of 22-inch, .25 wall, pipe in 40-foot joints, plain end, beveled for welding. This pipe is mill rejects, but is in excellent condition.

All this equipment is located nine miles west of Odessa, Texas, at Sid Richardson Carbon Co. If interested, contact W. F. Matheny, Sid Richardson Carbon Co., 629 Fort Worth Club Building Fort Worth, Texas, or H. H. Offutt, Sid Richardson Carbon Co., Odessa, Texas.

EQUIPMENT FOR SALE

FOR SALE—Cardwell Draw Works, Model "L"—Air Clutches—A-1 Condition. Box 3246, Corpus Christi, Texas.

FOR SALE: Near Burrton, Kansas, 1–25' x 84' x 12 Bay, 13 Louver, Pritchard Atmospheric Cooling Tower, Type DW 36-12B with cooling tower coil shed. Distillation unit recently moved, rendering tower surplus. Cities Service Oil Co., Patridge, Bartlesville, Okla.

PIPE — PIPE — PIPE

All Sizes

Lapweld and Seamless
Used Oil Well Casing and Tubing
Large Quantity Carloads
Immediate Loading and Delivery
All Guaranteed No. 1 Pipe
With Certificate of Inspection
Carload Lots Only
The Market's Lowest Prices

For further information write:

Box C-784,
The Oil and Gas Journal,
Tulsa, Oklahoma

EQUIPMENT WANTED

WANTED: 3½" OD or 4½" OD used drill pipe, 3½" OD line pipe or tubing. SCHAFER PLOW, INC. Box 578, Pratt, Kansas. Atten.: J. L. Crowder.

EQUIPMENT WANTED

Am interested in purchasing good-second-hand, unit 15 rig, with either 2 or 3 motor compound. Please send description, price, and location to: Box C-732, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED—Good condition, 30 to 50 H.P. Oil Engine. Also 35 H.P. gas engine. Both with clutches. R. E. French, Gridley, Kans.

WANTED: Want to buy a 2 or 3 drum hoist and steel tubing mast from shot or slim hole machine. Mast should be about 85 feet long. Also want rotary table with 13-inch or larger opening weighing less than 1300 lbs. Omaha Drilling Corp., 634 Service Life Bldg., Omaha 2, Nebraska.

HELP WANTED

GROWING Independent in Rocky Mountain area has opening for a chemist with 1-3 years experience in a petroleum laboratory. Reply Box C-762, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES ENGINEER

Experienced in gas compressing equipment Address Manager of Sales, The J. B. Beaird Company, Inc., Shreveport, Louisiana.

WANTED: Steam Boiler Plant and Utility Foreman. Must have engineering background with 3 to 5 years practical experience. Location: newly constructed oil refinery in Rocky Mountain Area. Write giving training, experience, references and personal details to: The Carter Oil Company, P. O. Box 2094, Billings, Montana.

SALESMAN: Independent refiner wants experienced salesman for Iowa. Excellent opportunity for aggressive man who can continue to hold and build business. Write fully, state experience and salary basis desired. Box C-738, The Oil and Gas Journal, Tulsa, Oklahoma.

CORROSION ENGINEER

Graduate engineer experienced in all types of oil field corrosion to take charge of field corrosion problems and research work. Under 40 years of age.

RESERVOIR ENGINEER

Experienced reservoir engineers including specialist in secondary recovery problems on both water and gas.

WIRE LINE OPERATOR

Man experienced in wire line work to operate bottom-hole sampling truck and perform some related laboratory work.

In reply state experience, education and salary expected.

CONTINENTAL OIL COMPANY
Personnel Division, Ponca City, Okla.

HELP WANTED

WANTED: Supervisor for refinery pump and engine maintenance. Applicant must have engineering training and experience. Good salary with house furnished at low rent. Box C-746, The Oil and Gas Journal, Tulsa, Oklahoma.

RESEARCH INSTITUTION wants engineer with experience in natural gas engineering for research in laboratory and field on gas-flow. Excellent opportunity for authorship of papers. Please give references, experience and salary expected. Box C-764, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED—Geologist with at least six years' well completion experience in Texas Gulf Coast Area. Box C-758, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Sales Executive: Large midwest independent has immediate opening for experienced bright stocks and neutrals sales executive. Unusual opportunity. In replying give full information stating age, education, experience, salary required. Replies will be held confidential. Box C-790, The Oil and Gas Journal, Tulsa, Oklahoma.

ESTABLISHED manufacturer of oil field supplies has opening in West Texas—New Mexico area for one or more qualified sales representatives. Offers permanent position with excellent opportunity for advancement. Good starting salary with automobile furnished and expenses paid.

Applicants must have clean personal and business record. Knowledge of well cementing helpful. Please give, in own handwriting, full particulars as to age, experience, education, marital status, physical appearance, present employment, references, and salary expected. Box C-777, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES ENGINEERING OPPORTUNITY

Large established manufacturer heat transfer equipment has opportunity for young engineer, preferably having 5-10 years experience oil refinery operation or design. Engineer selected will be trained for sales engineering and application engineering on heat transfer equipment. Replies treated in confidence. Describe complete background in first letter.

BOX C-759
The Oil and Gas Journal
Tulsa, Oklahoma

WANTED
CHIEF CHEMIST FOR CONTROL LABORATORY

TYPE PLANT: Absorption plants with reformer unit producing conventional petroleum products.
QUALIFICATIONS: Position requires person with knowledge of usual control analyses, knock engine operation, water treatment, pod analysis, and general work associated with gasoline plant operation.
LOCATION: Southeast Texas, Gulf Coast area.
HOUSING: Available in immediate area.
SALARY: In line with responsibilities.

Box C-775, The Oil and Gas Journal, Tulsa, Oklahoma

ENGINEERING

During the next several months we will increase our Engineering Organization engaged in the design of Oil Refinery Plants and Power Plants. Location Cleveland, Ohio. The men we need should be qualified as draftsmen, designers, checkers or in higher engineering skills on design of piping, instrumentation, pressure vessels, structural steel, concrete, mechanical or electrical. For presenting your qualifications and prompt consideration, write to us for application form.

ARTHUR G. McKEE & CO.

2300 Chester Ave., Cleveland 1, Ohio

HELP WANTED

ENGINEERS, Executives, Technical Men: Salaried positions—$3600 to $30,000. This confidential service for outstanding men who desire a change of connection, will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 1204 Berger Bldg., Pittsburgh 19, Pa.

ENGINEER: Midwest independent operating four refineries producing light oils, lubes, waxes and asphalts requires engineer with a minimum of 10 years refinery process and engineering design. Should be capable of carrying projects from economic study through process calculation, equipment design, and operating technique. Future for right man excellent. Give full particulars in first letter. Replies held confidential. Box C-787, The Oil and Gas Journal, Tulsa, Oklahoma.

MIDWEST Refinery desires electrician with experience on Cottrell precipitator. Write: Box C-768, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST experienced in Rocky Mountain area, by independent producer. Give record of employment. Unusual opportunity for capable man. Liberal salary and expenses, also bonuses. Answers held confidential. Address Box C-769, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR work in South America, Seismic Interpreter with Party Chief experience. State references, experience and salary. Box C-771, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

ATTENTION—OIL EXECUTIVES

Do you need a top flight experienced, honest, sober and aggressive Executive Assistant to assume heavy responsibilities? Texas University Graduate, B.B.A. degree, majored in Accounting, minored in Economics, Age 36, married, 15 years broad experience in all phases of the oil industry which includes planning, organization and direction of accounting, production, drilling, Geological, purchasing, leases and royalties, drilling deals, pipeline, joint venture operations, recycling, refining and marketing. Presently employed in Executive Capacity in Houston. Desires connection as Executive assistant to manager or owner of substantial and aggressive Independent Oil or drilling company, with heavy responsibilities. Prefer Texas location, but will consider out of state, best of references as to character and business qualifications. Interview solicited, Salary $833.00 per month. Box C-774, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY MANAGER wishes to make change. Range $10,000 to $12,000 per annum. Write Box C-765, The Oil and Gas Journal, Tulsa, Okla.

PROCESS ENGINEER: Degree. 4 yrs. experience process engineering and design. Highest personal and professional qualifications. Thoroughly faciliar catalytic cracking, vapor recovery, topping operations. Desire connection progressive refiner west or southwest. Available reasonable notice. Age 27, married, references. Box C-776, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY SUPERINTENDENT

With 20 years experience, available in 60 days. Box C-786, The Oil and Gas Journal, Tulsa, Oklahoma.

MECHANICAL Engineer with 15 years experience in natural gasoline, chemical plant and carbon black design and construction. Presently employed as resident engineer at natural gasoline plant by contractor, desires position as engineering supervisor at permanent location. Box C-792, The Oil and Gas Journal, Tulsa, Oklahoma.

COMMERCIAL Pilot-Mechanical Engineer seeks combination position. Instrument rating, 2,000 hours flight time. Box C-789, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: Age 31. Four years experience Permian Basin and Rocky Mountain. Box C-793, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: Experienced in subsurface and well Geology, also some experience in petroleum engineering, desires position in Rocky Mountain area. Single, age 30, available in May 1949. Box C-781, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

SECRETARY with initiative and executive ability, extensive oil experience and with legal training desires permanent connection with independent oil company in Mid-Continent area. Available soon. Write Box C-780, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASE AND DRILLING BLOCKS

WE have some good drilling blocks, close in leases to good production. Will take small override, in Clinton County oil field. John A. Damron, Albany, Kentucky.

PRODUCTION FOR SALE: Twelve hundred acres shallow, sixteen producing wells at nine hundred feet. Fifty thousand dollar equipment, including drilling rig on lease. Wells come in from 15 to 100 barrels per day. High grade diesel oil. Cash $125,000. K. O. & G. Co., 417 Lamar Ave., Houston, Texas. Phone A-85830.

DRILLER wants someone to take small financial interest drilling some shallow wells. Those not in position to gamble not wanted. Property merits inspection and consideration. Box C-785, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE

SMALLEST, prettiest Miniature Tri-Cone Rock Bit made. Less than one-half inch diameter. Cones turn. Gold or nickel plate. On tie chain clasps, strap type for watch fobs and ring type for charms.

$5.00 each

Money Order or C. O. D.

H. McGAUGHEY
P.O. Box 11063, Houston, Texas

FOR SALE—MAPS

1949 EXECUTIVES MAP OF PERMIAN BASIN

showing sections, surveys, towns, oilwells, drilling wells, dry holes, field names, depths, producing horizons, discovery dates, larger lease blocks, in three colors. Size 3 x 4 ft.

Price $10.00

Descriptive illustrated folder on request.

SOUTHWEST MAPPING COMPANY
1101 Ft. Worth Nat'l Bldg.
Fort Worth 2, Texas

LEASE AND DRILLING BLOCKS

WANTED to Purchase by Independent Oil Company—Oil Production in Kentucky, Indiana and Illinois. Will consider leases producing 25 to 250 barrels daily. Box C-757, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASES ROYALTIES

PRODUCING OR NONPRODUCING

Texas, New Mexico, Oklahoma, Louisiana and Illinois

Inquiries Invited

B. D. BUCKLEY

60 Broadview Drive, Clayton (5), St. Louis, Missouri

WAREHOUSE SPACE—FOR RENT

WAREHOUSE space in Wichita Falls, Texas. Prefer tenant handling oil field specialties. Attractive new building on main highway. Convenient to oil field supply companies. If interested communicate with Larkin Packer Company, 1502 Maury Street, Houston, Texas.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing. Catalog and Samples on request. Burkhart Printing & Stationery Company, 118 South Cincinnati, Tulsa 3, Oklahoma.

WANTED

ESTABLISHED manufacturers' agents seek additional representation New York metropolitan area. Interested in Petroleum, Chemical ,Processing and Industrial Equipment. Box C-756, The Oil and Gas Journal, Tulsa, Oklahoma.

MAILING LISTS

OPERATING Personnel Lists of Production, Refining, Natural Gasoline, Pipelines Drilling, Supply Stores, etc. Guaranteed Catalogue Free. Our 29th Year. Oil Industry Mailing List Co., Box 2603, Tulsa, Okla

SERVICES

Would you like a New York export office with all its conveniences and none of the expense?

We are interested in handling all exports for a well established oil refinery. We have our own offices abroad and our experience dates back twenty-five years.

Box C-782

The Oil and Gas Journal
Tulsa, Oklahoma

FOR SALE—MAPS

COUNTY MAPS

For Oil & Gas Industry, Public Offices, and Travelers

CALIF.: with Twnshp., Rng., Sec., Mines, Roads, Trails, Streams, Lakes, R.R., Schools, Rngr. Sta., Elev., Ntl. Forest, Pwr. Lines, Canals, Boundaries, Oil Districts, etc.

Sizes: 20 x 30 to 73 x 100 inches

Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Glenn, Kings, Lake, Marin, Mariposa, Merced, Napa, Nevada, Orange, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Sierra, Solano, Sonoma, Stanislaus, Sutter, Ventura, Yolo, Yuba—**each $1.**
Tuolumne, Santa Barbara, Plumas, Placer, Modoc, Madera—**$1.50.**
Tulare, Tehama, Imperial—**each $2.**
San Diego, Mendocino, Humboldt—**$2.50.**
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Fresno, Kern, Riverside—**$2.50 - $5.**
Los Angeles—**$1 and $3.**
Siskiyou—**$2 and $4.**
Inyo County, **$15**; E or W½, **$7.50**; San Bernardino, 73x110, **$15**; No. or So. ½, **$7.50**; NW., SW., NE., or SE. ¼, **$3.75.**

Also Oregon, Idaho and Washington County Maps

WORLD'S MINERALS
2417 San Pablo Avenue, OAKLAND 12, California. TEmplebar 2-3870

ROYALTIES

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico.

ROYALTIES IN HOT AREAS!
Recent strikes have focused attention on Montana's deeper oil zones and major companies are moving fast, drilling and leasing. We buy direct in the field, sell direct to our customers. Write LANDOWNERS ROYALTIES COMPANY, Box 1225, Great Falls, Montana.

"ROYALTIES": In the Bronte field, producing and adjoining tracts. Call, wire, or write Joe Carter, Bronte, Texas. Phone 166.

Equipment Men

(Continued from page 147)

Baroid Sales Makes Coale Assistant General Manager

George B. Coale has been named assistant general manager of National Lead Co.'s Baroid Sales division effective February 15. His company career began in 1935, when he was appointed chief engineer of the Sayreville factory power plant. After 2 years, he became mechanical superintendent at the plant, and then spent 5 years in the Navy. He returned to National Lead in 1945 as assistant chief engineer, and was named chief engineer of the company in January 1949.

Lukenheimer Announces Representative Changes

Lukenheimer Co., manufacturer of bronze, iron, and steel valves, announces the following changes in territorial representatives: Elmer R. Tieberman, representative with headquarters in Tulsa, has transferred to Dallas, covering northeastern Texas, northern Louisiana, and part of Arkansas. Duffie "Dave" Davis, formerly located at Wichita Falls, succeeds Tieberman at Tulsa.

William A. Boles, Wichita Falls, recently joined the Lukenheimer organization and will take over the territory formerly handled by Davis.

Brown Makes Wilson Sales Manager of Larger Area

O. B. Wilson, eastern regional sales manager for Brown Instruments division of Minneapolis-Honeywell Regulator Co., has been named manager of sales for the east, southeast, and central regions.

Wilson, who has been with the industrial instruments division of Honeywell for the past 25 years, will supervise sales in the area extending from Florida and the Gulf of Mexico to the Canadian border. He will make his headquarters at the Brown plant in Philadelphia.

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CALENDAR

February

American Institute of Mining and Metallurgical Engineers, annual meeting, Fairmont Hotel, San Francisco, February 13-17.

American Society for Testing Materials, spring meeting and A.S.T.M. committee week, Hotel Edgewater Beach, Chicago, Ill., February 28-March 4.

March

American Petroleum Institute, Southwestern district, Galvez Hotel, Galveston, Tex., March 9-11.

American Association of Petroleum Geologists, regional meeting; Society of Exploration Geophysicists, and Society of Economic Paleontologists and Mineralogists, Jefferson Hotel, St. Louis, Mo., March 14-17.

American Petroleum Institute, division of production, Mid-Continent district meeting, Mayo Hotel, Tulsa, March 23-25.

New England Gas Association, Hotel Statler, Boston, March 24-25.

Western Petroleum Refiners Association, thirty- seventh annual meeting, Plaza Hotel, San Antonio, Tex., March 28-30.

American Chemical Society, division of petroleum chemistry, spring meeting San Francisco, March 27-April 1.

April

Texas Independent Producers and Royalty Owners Association, Houston, April 1.

American Petroleum Institute, division of Refining, mid-year meeting, Shamrock Hotel, Houston, April 4-7.

American Society of Lubrication Engineers, annual meeting, Pennsylvania Hotel New York, April 11-13.

National Association of Corrosion Engineers, annual convention, Netherlands Plaza Hotel, April 11-14, Cincinnati, Ohio.

Southwestern Gas Measurement Short Course, University of Oklahoma, College of Engineering, Norman, Okla., April 12-14.

National Petroleum Association, Hotel Cleveland, Cleveland, Ohio, April 13-15.

Natural Gasoline Association of America annual meeting, Texas Hotel, Fort Worth April 20-22.

Southern Gas Association, annual convention, Buena Vista Hotel, Biloxi, Miss., April 20-22.

American Petroleum Institute, Eastern district, William Penn Hotel, Pittsburgh, Pa., April 27-29.

May

Independent Petroleum Association of America, midyear meeting, Roosevelt Hotel, New Orleans, La., May 3-4.

American Petroleum Institute, division of marketing, mid-year meeting, Jefferson Hotel, St. Louis, May 9-10.

American Gas Association, natural-gas department, spring meeting, French Lick Springs Hotel, French Lick, Ind., May 9-10.

Interstate Oil Compact Commission, spring quarterly meeting, Roosevelt Hotel, Jacksonville, Fla., May 10-12.

American Petroleum Institute, division of production, Pacific Coast district meeting, Biltmore Hotel, Los Angeles, Calif., May 12-13.

Instrument Society of America, annual spring meeting, Royal York Hotel, Toronto, Canada, May 12-13.

Oil-Heat Institute of America, national oil-heat exposition and annual convention, Boston, Mass., May 16-20.

American Petroleum Institute, Rocky Mountain district, Gladstone Hotel, Casper, Wyo., May 26-27.

Natural Gas and Petroleum Association of Canada, annual meeting, Hotel London, London, Ont., Canada, May 26-27

Fourth Annual Short Course in Gas Technology, sponsored by Southern Gas Association, Texas College of Arts and Industries, Kingsville, Tex., May 30-June 1.

June

American Society for Testing Materials, fifty-second annual meeting, Hotel Chalfonte Haddon Hall, Atlantic City, N. J., June 17-July 1.

Pennsylvania Grade Crude Oil Association annual meeting, Hotel William Penn, Pittsburgh, Pa., June 16-17.

September

National Petroleum Association, Hotel Traymore, Atlantic City, N. J., September 14-16.

October

National Lubricating Grease Institute, Hotel Roosevelt, New Orleans, La., October 3-5.

American Gas Association, annual convention, Chicago, Ill., October 17-20.

NOMADS

Houston Nomads, second Monday of each month, Ye Olde College Inn, Houston.

Los Angeles Nomads, second Wednesday each month, Jonathan Club.

LEGAL

GOVERNMENT BARGE—Sealed bids will be received up to 10:00 A.M. on February 24, 1949, for a large barge approximately 100-foot length, 36-foot beam and 5-foot depth. This barge was assembled from 58 T-6, 5 T-7, 3 T-8 and 3 T-11 Navy pontoons. The motive power consists of two Murray and Tregurtha Model O Inboard Propulsion Units. It is now located on Lake Pontchartrain and its exact location can be ascertained from Mr. T. W. Serpas, President of St. Bernard Parish Police Jury, or Mr. J. Harris, Parish Engineer, Chalmette, Louisiana. It is to be sold to the highest bidder for cash as is, where is. The right is reserved to reject any or all bids. Cashier's check payable to the Treasurer of the United States for the full amount of the bid must accompany each bid. Bids must be submitted in duplicate and may be mailed or delivered to W. H. Sindt, Division Engineer, Federal Works Agency, Bureau of Community Facilities, Room 1003 Texas and Pacific Building, Fort Worth, Texas. Unsuccessful bidders' checks will be returned. Award will be made after tabulation of the bids is submitted to the Central Office in Washington, D. C.

Galveston Bay, huge rotary drilling rigs bore nine thousand feet under the sea for oil. Long strings of pipe put tremendous shock loads on wire rope. TRU-LAY Preformed stands up extremely well even under such treatment.

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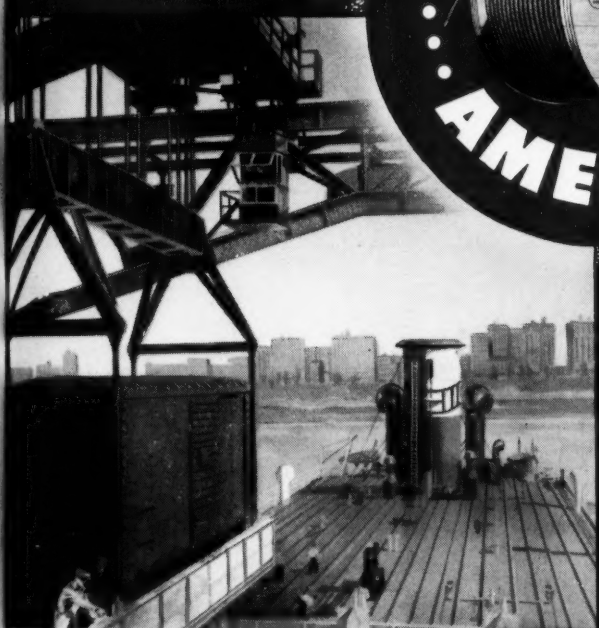

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